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Growth Performance of Broiler Finisher Chickens Served Carrot (*Daucus carota* L.) Leaf Extract as Supplementary Source of Vitamins and Minerals

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Abstract

A 28 days feeding experiment involving 208 chicks of four weeks old Hubbard broiler strain was carried out in a completely Randomized Design to determine performance and indices of broiler finisher fed carrots leaves extract (CLE) as a supplementary sources of vitamins and minerals at four days interval. The birds were randomly assigned into four treatments group containing water only (control), water + 5 g vitalityte, Water +40 ml CLE, Water +80 ml CLE per litre of water coded as T1, T2, T3 and T4 respectively. Each group was replicated four times with fifty chicks per treatment. The leaves was found to be rich in ash (21.5%) most especially Ca, P, K, Mg, N and Na, vitamins (A,C and E) and relatively low in fibre hence a good vitamins and minerals supplement in the tropics as it encouraged feed intake and weight gain. Record of feed intake was recorded on daily basis while initial weights of the birds were taken at the beginning of the experiment and weekly thereafter. Body weight gain was calculated as the differences between the final and initial body weight gain. Mortality was recorded as it occurred. Result showed significant effects ($p<0.05$) on body weight gained and total feed intake. Birds served 80 ml CLE per litre of water had the highest final body weight gained and total feed intake than any other treatment ($p<0.05$). It was recommended that poultry farmers can use carrot leaf extract at 80ml as a source of vitamins and minerals.

Keywords: Broilers, extracts, performance, proximate composition, vitamins and minerals

Introduction

Vitamins and minerals are two of the six classes of food nutrients and both are produced by several companies in synthetics form. They are either produced in combination as vitamin-minerals premix or individually as vitamins supplement and minerals supplement. Vitamins-minerals premix is added to the formulated diets to meet up the requirements of minerals and vitamins that are deficient in the diets (McDonald *et al.*, 2002, Alu, 2015). Under intensive system, poultry are susceptible to vitamins and minerals deficiencies and it is general practices to include all supplemental vitamins and minerals at the levels that will provide safety under various stress conditions to which birds may be exposed (Oluyemi and Roberts, 2000, Asaduzzaaman *et al.*, 2005). According to the authors, in spite of adding vitamins-minerals premix in formulated diets, diseases of various kind broilers chickens and deficiencies were observed. This could be due to poor quality of premixes used and lack of information on the efficacy of different commercial vitamins-minerals premixes in the Nigerian market thus, this necessitate the search for alternative such as carrot (*Daucus carota*) is an annual or biennial root vegetable crop cultivated for its leaves and tuber. The leaves are one of the most abundant by-products found in the study area (Aliero, Kebbi State). It is a waste material that is rich in vitamins and minerals (Dias, 2012).

This study determined the growth performance of broiler finisher chickens served carrot leaf extract as supplementary source of vitamins and minerals

Materials and Methods

Experimental design and procedures: A total of two hundred and eight (208) day old chicks were used for the study. The birds were randomly assigned in to four treatment containing Water only, Water + 5 g vitalityte, Water + 40 ml CLE and 80 ml CLE per litre of water coded as T1, T2, T3 and T4 respectively in a completely randomized design (CRD). The experimental diets for broiler chickens are shown in Table1.

Collection and preparation of extracts: The fresh leaves of *Daucus carota* were collected from the carrot's sellers at Aliero Metropolis. 2 kg of fresh leaves of carrots were washed and ground in a mortar and pestle. This was squeezed and filtered with sieve to obtain the homogenous extract of the CLE in one litre of water. The extracts were prepared at four days interval, the CLE obtained thereafter were preserved in the refrigerator.

Statistical analysis: The data collected was subjected to analysis of variance (ANOVA) using SPSS computer software package and means separation were carried out using Duncan multiple range.

Table 1 Composition of the experimental diet for finisher broiler chickens

Ingredients	Finisher (%)
Maize	54
Groundnut Cake	24
Wheat Offal	12
Blood Meal	4.0
Bone Meal	2.5
Egg shell	2.5
Premix	0.3
Methionine	0.2
Lysine	0.2
Salt	0.3
Total	100
Calculated nutrients	
CP (%)	22.07
ME (Kcal/Kg)	2840
Ca (%)	1.59
P (%)	0.35
CF (%)	0.35
EE (%)	5.1

Results and Discussion

The proximate composition of carrot leaf was shown in the Table 2. Results showed that carrot leaf (CLE) was found to be rich in ash (21.5%) most especially Ca, P, K, Mg, N and Na. CLE was also found to contain appreciable level of crude protein (10.0%) and low crude fibre (3.8%). The value exceeds 1.48% and 0.05% reported by Machebe *et al.* (2010). The crude fibre value obtained in the present study is lower than the crude fibre value of 6.41% reported by Lodokun *et al.* (2016). The lower crude fibre of CLE makes it potential feeds stuff for monogastric that originally have little capacity to digest fibre. This supports the findings of Dias (2012), Carlos and Dias (2014) who reported that carrot is a good source of dietary fibre.

The results of the performance of finisher broiler served CLE as vitamins and mineral supplement are presented in Table 3. Results obtained showed that administration of vitalityte and CLE to finisher broilers significantly ($p < 0.05$) increased body weight gain and total feed intake. Birds supplemented with (80 ml CLE per litre of water) had similar total feed intake value with birds on T3 (40 ml) and this was significantly ($p < 0.05$) higher than the total feed intake values of birds on T1 (control) and T2 (vitalyte). The different responses of birds to the levels of CLE with respect to feed intake may be as a result of the availability of useful vitamins and minerals inherent in the extract. Oluyemi and Roberts (2000) reported that the incorporation of both micro and macro nutrients in poultry diets enhances feed intake and utilization.

Table 2 Chemical Composition of carrot leaf

Parameters	Composition (%)
Moisture	3.67
Crude Protein	10.00
Crude fibre	3.83
Ether extract	3.83
Ash	21.5
Nitrogen free extract	57.16
Minerals (mg/100g)	
Calcium	2.47
Phosphorus	5.07
Potassium	93.00
Nitrogen	1.60
Magnesium	1.50
Sodium	10.00
Vitamins (mg/100g)	
A	0.84g
C	38.31g
E	467.76g

Table 3. Performance indices of broiler at finisher phase fed CLE

Parameter	T1CTR	T25gVTL/L	T3 40ml/L	T4 80ml/L	SEM
Initial body weight (g/b)	849.15	849.12	849.15	849.10	24.79
Final body weight (g/b)	1832.50	1790.00	1887.50	1937.50	296.40
Body weight gain (g/b)	1418.75 ^c	1831.25 ^b	1956.25 ^b	2368.75 ^a	106.35
Total feed intake (g/b)	2942.00 ^b	2928.00 ^b	2968.00 ^{ab}	3003.75 ^a	101.30
Daily feed intake (g/b)	88.98	89.76	89.77	92.13	4.75
FCR (g feed g ⁻¹ gain)	1.62	1.64	1.60	1.53	0.04
Mortality (%)	7.69	9.62	9.62	9.61	4.45

^{abc} Mean values along the same row with different superscript are significantly different ($p < 0.05$).; FCR = Feed Conversion Ratio; SEM = Standard error mean; CTR = Contrl; VTL = Vitalyte

The best weight gain was observed on birds served levels of CLE per litre of water compared to vitalitye (7325.00 g/bird) and control (5675.00 g/birds) groups. The higher weight gain of birds fed levels of CLE could be as results of higher digestion of the nutrient consumed by the birds and greater efficiency in the utilization of feed which resulted in enhanced growth. Zhang *et al.* (2005) had earlier reported that plants extracts possess digestion stimulating properties. Also, Bedford (2000) reported that herbs reduced some harmful bacteria in the gastrointestinal tract of broilers which leads to higher efficiency and utilization of feed and consequently higher weight gain. Birds on T1 (control) had the lowest weight gain and this may be attributed to none inclusion of either synthetic vitalitye or CLE. This finding agrees with earlier reports of Nworgu *et al.* (2007) and Machebe *et al.* (2010) that leaves extract contain active ingredients which are beneficial to the growth of the birds. Bello *et al.* (2016) reported similar findings for broiler finisher birds fed onion bulbs extract.

References

- Alu, S.E. (2015). *Primer of animal nutrition and biochemistry*, 1st edition. Onaivi Printing and Publishing Co., Ltd. Keffi, Nasarawa State, Nigeria.
- Aro, S.O. and Akinmoyegun, M.B. (2012). Hematology and blood cell osmotic stability of pigs fed graded levels of fermented cassava based diets. *Proceedings of the 17th Annual Conference of Animal Science Association of Nigeria*, held at Abuja, Nigeria. Pp: 412-415.
- Asaduzzaaman, M., Jahan, M.S., Mondol, M.R., Islam, M.A. and Sarkar, A.K (2005). Efficacy of different commercial vitamin-minerals premixes on performance of laying pullets. *International Journal of Poultry Science*, 4(8): 589-592
- Bedford, M. (2000). Removal of antibiotic growth promoters from poultry diets. *World's poultry science Journal*, 56: 347-365.
- Bello, S., Mayowa, A.C. and Abubakar, A. (2016). Performance of finisher broiler chickens fed onion bulb extract (OBE) as supplementary source of vitamins and minerals. *5th Proceedings of the ASAN-NIAS Annual Conference*, held at Port-Harcourt, River state, Nigeria.
- Carlos, J.S. and Dias, S. (2014). Nutritional and Health benefits of carrots and their seed extracts. *Food and Nutrition Sciences*, (5): 2147-2156.
- Dias, J.S. (2012). Nutritional quality and Health benefits of vegetables. A review. *Food and nutrition Sciences*, (3): 1354-1374.
- Durranni, F.R., Sanaullah, N. Chand, Z.D. and Alchta, S. (2008). Using aqueous extract of aloe agel as anti-coccidial and immune-stimulant agent in broiler production. *Sarhad Journal of Agriculture*, 24(4): 665-669.
- Ekam, V.S., Udosen, E.O. and Chighu, A.E. (2006). Comparative effect of carotenoid complex from goldenro-life dynamite and carrot extracted carotenoids on immune parameters in albino wistar rats. *Nig. Journal of Physiological Sciences*, 21: 1-4
- Lodokun, O. A.Obe, A.A., Oso, A.O, Oke, O.E. and Abiona, J.A. (2016). Performance and egg quality characteristics of egg-type chickens as influenced by fluted pumpkin (*Telferia occidentalis*) leaf extract. *Nig. Journal of Annual Sci.*, 18(1): 42-48.
- Nidaullah, H., Durrani, F.R., Ahmad, S., Jan, I. U. and Gul, S. (2010). Aqueous Extract from different medicinal plants as anticoccidial, growth promotive and immunostimulant in broilers. *ARPN J. Agric. and Biological Science*, 5(1): 53-59.
- Machebe, N.S., Agbo, C.U. and Onuaguluchi, C.C. (2010). Performance of finisher broilers served *Gongronema latifolia* Benth Leaf extracts as supplementary source of vitamins and minerals, in *Proceedings of the 15th Annual Conference of Animal Science Association of Nigeria*
- Nworgu, F.C. and Ebunike, G.N. (2007). Traditional application to livestock management and improvement in Nigeria. An invited paper presented at the 2nd Annual Conference of Nigerian Society of Indigenous Knowledge and Development (NSTKAD) at Cross River University of Technology, Obubra Campus on the 9-11th November, Pp: 1-25.
- McDonald, P., Edwards, R.A., Greenhalgh, J.F.D. and Morgan, C.A., (2002). *Animal nutrition*, 6th edition. Pp: 33-37.
- Oluyemi, J.A. and Roberts, F.A. (2000). *Poultry production in warm wet climate*. 2nd edition, Macmillan Publishers London.

- Rubatsky, Q. and Siman, P.W. (1999). Fact sheet for health professionals: Vitamin A. Office of dietary supplements, National Institutes of Health. 3 June 2013. Archived from the original on 17 May 2008. Retrieved 8 April 2008.
- Swenso, M.A. (2004). Vitamin contents of flower and seeds of *Moringa oleifera*. *Pakistan Journal of Biochemistry*, 21:21-24.