

**Journal of Agriculture, Environmental Resources and Management**

ISSN2245-1800(paper) ISSN 2245-2943(online)

6(1)1-800; **JAN**.2024; pp114-120
**Growth and economic performance of finisher broilers served pineapple (*Ananas comosus L.*) peel extract as a supplementary sources of vitamin and mineral**
<sup>1</sup>Dabai, S.A., <sup>2</sup>Bello, S. <sup>2</sup>Umar, Y., <sup>1</sup>I.M Harande and <sup>3</sup>I. Hamisu

<sup>1</sup>Department of Animal Science, Federal University of Agriculture Zuru Kebbi State, PMB 28, Zuru – Nigeria.

<sup>2</sup>Department of Animal Science, Faculty of Agriculture, Kebbi State University of Science and Technology, PMB 1144, Aliero, Nigeria.

<sup>3</sup>Department of Biology, School of Science, Adamu Augie College of Education P.M.B 1012, Argungu Kebbi State – Nigeria.

**Corresponding author:** saidualiyudabai2014@gmail.com;

**Abstract**

The study was conducted to investigate the effect of vitamins-minerals premix and pineapple peel extract (PPE) supplementation on the growth and economic performance of broiler finisher birds in drinking water. A total of one hundred and forty-four (144) 28-day old finisher broilers were randomly assigned into four treatments namely: T1 drinking (water only), T2 (5g vitamins-minerals premix), T3 (40 PPE) and T4 (80 ml PPE). Each treatment was replicated thrice with twelve (12) birds in each replicate in a completely randomized design (CRD). Parameters measured were body weight, body weight gain, feed intake, feed conversion ratio (FCR) and mortality. The study also evaluated cost of feed per kilogram, cost of feed consumed, cost of feed per Kg weight gain and cost of total revenue were also evaluated. Results of the growth performance parameters showed no significant ( $P>0.05$ ) difference across the treatments for all the parameters evaluated except for body weight gain. Significantly ( $P<0.05$ ) higher weight gain of 796.51 g/bird was recorded for birds in T4, followed by T3 (689.32 g/bird), T2 (589.48 g/bird) and T1 (483.02 g/bird). On the other hand, the results of economic parameters showed that the cost of feed per kilogram, cost of feed consumed and cost of feed per Kg weight decreased with the inclusion of PPE in the water. In conclusion, administering PPE in drinking water of finisher broilers has great nutritional and economic effectiveness hence; supplementation up to 40ml maximizes growth and increased profitability of broiler enterprises.

**Key words:** Performance, extract, pineapple, broiler

**Introduction:** By-products of plant such as extract feature high concentration of vitamins and minerals (Bello, Christianah, Muftau and Abubakar, 2016; Bello, Lailaba, Usman and Dabai, 2018). These two food nutrients (vitamins and minerals) are essential, but in small amounts for normal growth and maintenance of animal life (McDonald,

Edwards, Greehalgh, Morgan, Sinclair and Wilkinson, 2010) and they cannot be synthesized by poultry thus need to be included in their diets. Findings suggested that plants extract can conveniently replace the use of some conventional sources of vitamin and mineral supplements in rural areas where premixes are not readily available and

**Growth and economic performance of finisher broilers served pineapple (*Ananas comosus L.*) peel extract as a supplementary sources of vitamin and mineral**

affordable due to cost. In addition, plants extract contains higher quality proteins, vitamins and minerals which have been found to play a significant role in promoting growth (Nwosu, Igugo and Uwadiogwu, 2020; Dabai, Bello and Dabai, 2021) and preventing poultry disease (Bello, 2013, Asuama, 2015). Olumo (2011) stated that vitamins and minerals are essential in feed utilization, growth and maintenance of body weight. Plants extracts are rich in bioactive compounds eg phenol, alkaloid and flavonoid which have been found to have antimicrobial and antioxidant properties (Bello, Akit, Loh, Abas and Foo, 2021). Among the alternatives vitamins-minerals premix, pineapple wastes have been identified as appropriate applicant. Pineapple (*Ananas comosus*) belongs to the family Bromeliaceae. Its fruit and wastes have been reported to contain fibre, vitamins (A, B and C), minerals (Ca, P and Fe), phytochemicals and bromelain (Hossain and Rahman, 2011; Ketnawa, Chaiwut and Rawdkuen, 2012). Bromelain, a protein enzyme is said to have digestion properties and enhances absorption of nutrients due to availability of minerals and vitamins. The study is therefore aimed to evaluate the growth and economic performance of finisher broilers served pineapple peels extract (PPE) as supplementary sources of vitamin and minerals.

**Materials and Method: Study Area:** The study was conducted at the poultry research unit, department of Animals Science, Faculty of Agriculture, KSUST, Aliero. Aliero is located within latitude 12°06'N and longitude 4°03'S in the Southeast of Kebbi State (KSUSTAM, 2020). The site has a maximum temperature of 33°C with humidity estimate at 35%; it has an average rainfall of 750mm annum.

**Collection of preparation of extracts:** Fresh pineapple peels were obtained from Jega Central market, Kebbi State. 2 kg of the peels were extracted by crushing them with a mortar and pestle, then squeezed, filtered with sieve to obtain the extract. The resulting extract was transferred to a labeled container and stored in a refrigerator until use to prevent contamination. The PPE was served through drinking water for 4 weeks at 4 days interval. Fresh water was given after consumption of extract for the remaining period of the day.

**Birds, diets and design:** A total of 144 Amo broiler chicks of 4 weeks old were randomly allocated to four treatment groups with three replicates (pens) each containing 12 birds: Water only (control), water + 5g vitalyte, water + 40ml PPE and water + 80ml PPE per litre of water for treatments 1, 2, 3 and 4 respectively in a completely randomized design (CRD). The birds were offered the same commercial Chikun feed.

**Data collection:** The initial body weight was measured and recorded at the beginning of the experiments and weekly thereafter. Feed intake, weight gain and feed conversion ratio (FCR) were measured, while mortality was recorded as it occurs. The cost of feed (₦/Kg) was calculated from the cost of bags used while feed cost per Kg weight gain was calculated by multiplying feed cost per Kg by FCR (Roberts, 2021).

**Statistical analysis:** The data collected were subjected to analysis of variance (ANOVA) using SPSS Software package and means were separated using Duncan's Multiple Range Test (Steel and Torrie, 1980).

## Results and Discussion

**Table 1. Growth performance of finisher broilers served premix and extract.**

Parameters	Treatments				SEM
	1	2	3	4	
Initial body weight (g/b)	807.50	809.31	812.22	817.22	6.94
Final body weight (g/b)	2076.06	2028.94	2124.50	2283.84	149.43
Body weight gain (g/b)	483.02 <sup>b</sup>	589.48 <sup>ab</sup>	680.32 <sup>ab</sup>	796.51 <sup>a</sup>	83.62
Daily feed intake (g/b)	138.00	139.67	144.71	140.23	33.69
FCR (g feed g <sup>-1</sup> gain)	3.52	2.44	2.13	1.78	0.61
Mortality (%)	25.00	8.33	5.56	2.78	7.08

ab- mean values along the row with different superscripts are significantly different (P<0.05)

KEY: FCR=feed conversion ratio

Neither premix nor extract had any significant effect on feed consumption at finisher phase. The results however showed that birds served levels of pineapple extract consumed more feed compared to premix and control groups (Table 1). This could be due to high contents of the micronutrients (minerals and vitamins) in extract. Oluyemi and Roberts (2000) reported that incorporation of micronutrients in poultry diets improves feed consumption and utilization. Results of the present findings are in agreement with those reported by Machebe, Agbo and Onuaguluchi (2013). Significant difference (P>0.05) was observed in weight gain of finisher broilers. The best weight gain of 796.51 g/bird was observed in birds served 80ml PPE/L compared to other treatments. This could be as a result of higher digestion of the nutrient consumed by the birds and greater efficiency in the utilization of feed which resulted in enhanced growth. Akit, Mohd Noor Zainudin, Abdul Wahid, Zakaria, Foo and Loh (2019) had earlier stated that dietary bromelain reduced harmful bacteria in the digestive tract of broilers. It could be that the bromelain possesses digestion stimulating properties thus enhancing the release of amino acids and

energy. This view is in line with earlier view of Hossain, Lee and Kim (2015), that bromelain is an effective natural digestive enzyme that aid breaks down of protein and cleanses the digestive tract. Similar findings have been reported by Begun, Li, Hossain and Kim (2015). They observed marginal reduction in weight gain of birds on control (T<sub>1</sub>) reaffirms the necessity of vitamin and mineral for optimum growth.

Feed conversion ratio (FCR) varied from 1.78 to 3.52 among the treatment groups (Table 1). The better FCR was observed in birds offered 80ml PPE per litre of water suggests the ability of the birds to utilize available nutrients in the feed and extract. This finding agreed with the report of Rahman and Yang (2018). They reported positive influence in feed, weight gain and feed conversion ratio of broilers fed pineapple leaf meal compared with control. Mortality was not influenced by the dietary treatments during trial period. The higher mortality of 25% was recorded in T<sub>1</sub> (control) compared to T<sub>2</sub> (8.33%), T<sub>3</sub> (5.56%) and T<sub>4</sub> (2.78%) for the birds served premix and levels of pineapple extract respectively. The lower

**Growth and economic performance of finisher broilers served pineapple (*Ananas comosus L.*) peel extract as a supplementary sources of vitamin and mineral**

mortalities observed in birds offered PPE could be due to medicinal effect of pineapple. The results obtained support the findings of Doyle

(2001), who reported that the application of medicinal plants reduces the number of mortality.

**Table 2. Cost analysis of finisher broilers served premix and extract**

Parameters	Treatments				SEM
	T1	T2	T3	T4	
Cost of feed per kilogram (₦)	126.4	122.8	97.5	119.2	110.5
Cost of feed consumed (₦)	1340.0	1343.0	1041.0	1243.0	112.0
Cost of feed per Kg weight gain (₦)	2574.0 <sup>a</sup>	2077.0 <sup>ab</sup>	1296.0 <sup>b</sup>	1818.0 <sup>ab</sup>	264.7
Cost of total revenue (₦)	3980.0	3605.0	2840.0	3325.0	33.69

ab- mean values along the row with different superscripts are significantly different (P<0.05)

There were no significant (P>0.05) difference on all the parameters evaluated except for cost of feed per Kg weight gain (P<0.05). Result of the present study indicated that feed cost was lower in birds served levels of extract. The declined of feed cost with inclusion of PPE could be due to cheaper cost of pineapple peels than premix. Onu, Nwose, Obianwuna and Ajah, (2016) reported that the inclusion of unconventional feedstuffs in finisher broiler diets minimizes cost of production. Ravindran (2013) estimated about 70% of the cost of poultry production out of which 95% is used to meet the requirement for the main ingredients supplying energy and protein. The result showed that feed cost per kilogram weight gain was highest (₦2574) in control and lowest (₦1818) in birds served 80ml per litre of drinking water. Feed cost per kilogram weight gain increased with increase in FCR, which agree with that of Goecsik et al. (2013) who reported that increased in FCR increased feed cost per Kg weight gain. They result also coincide with the report of Nworgu (2007) who reported significance difference in feed cost per kilogram weight gain in finisher broilers fed Fluted pumpkin (*Telfaria occidentalis*) leaf extract supplement.

**Conclusion:**It can be concluded that administration of PPE at 40ml per litre of drinking water maximizes growth and increased profitability of broiler enterprises.

#### References

- Akit, H., Mohd Noor Zainudin, N.N., Abdul Wahid, N.A., Zakaria, S.N., Foo, H.L. and Loh, T. C. (2019). Dietary bromelain improves nutrient digestibility, digesta viscosity and intestinal villus height as well as reduces intestinal *E. coli* population of broiler chickens. *Malaysian Journal of Animal Science*, 22(1), 1–16.
- Begum, M., Li, H.L., Hossain, M.M. and Kim, I.H. (2015). Dietary Bromelain-C.3.4.22.32 supplementation improves performance and gut health in sows and piglets. *Livestock Science*, 180, 177–182.
- Bello, S. (2013). Use of pawpaw (*Carica papaya*) leaf extract in the prevention of coccidiosis in broiler chickens. MSc Thesis. Department of Animal science, Faculty of Agriculture, Usmanu

**Growth and economic performance of finisher broilers served pineapple (*Ananas comosus L.*) peel extract as a supplementary sources of vitamin and mineral**

- Danfodiyo University, Sokoto, Pp55-57.
- Bello, S., Christianah, A.M., Muftau, M.A. and Abubakar, A. (2016). Performance of finisher broiler chickens fed onion bulbs extract (OBE) as supplementary sources of vitamin and mineral. *Proceedings of the 21<sup>st</sup> Annual Conference of Animal Science Association of Nigeria*, held on 18 – 22, 2016 at Port Harcourt, Nigeria.
- Bello, S., Lailaba, D.S., Usman, N. and Dabai, A.S. (2018). Growth performance of broiler finisher chickens served carrot (*Daucus carota*) leaf extracts as a supplementary source of vitamins and minerals. *Proceedings of the 23<sup>rd</sup> Annual Conference of Animal Science Association of Nigeria*.
- Bello, S., Akit, H., Loh, T.C., Abas, F. and Foo, H.L. (2021). Yield and antioxidant activity of lemongrass (*Cymbopogon citratus*) essential oil and aqueous extract. *Proceedings of the 2<sup>nd</sup> International Joint Graduate Seminar on Animal Science*, held on 12<sup>th</sup> June, 2021 at Universitas Gadjah Mada (UGM), Indonesia.
- Dabai, S.A., Bello, S. and Dabai, J.S. (2021). Growth performance and carcass characteristics of finisher broiler chickens served carrot leaf extract as a supplementary source of vitamins and minerals. *Nigerian Journal of Animal Science*, 23 (1): 144-149.
- Hossain, M.A. and Rahman, S.M. (2011). Total phenolic, flavonoids and antioxidant activity of tropical fruit pineapple, *Food research international*, 44:672-676.
- Hossain, M.M., Lee, S.I. and Kim, I.H. (2015). Effects of bromelain supplementation on growth performance, nutrient digestibility, blood profiles, faecal microbial shedding, faecal score and faecal noxious gas emission in weanling pigs. *Veterinarni Medicina*, 60(10): 544-552.
- Ketnawa, S., Chaiwut, P. and Rawdkuen, S. (2012). Pineapple wastes: A potential source for bromelain extraction. *Food and Bio-products Processing*, 90(3), 385–391.
- KSUSTAM (2020), Unpublished Metrological data, Soil Science Department, Faculty of Agriculture, Kebbi State University of Science and Technology, Aliero.
- 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 15<sup>th</sup> Annual Conference of Animal Science Association of Nigeria*.
- Nworgu, F.C. (2007). Economic importance and growth rate of broiler chickens served fluted pumpkin (*Telferia occidentalis*) leaves extract. *African Journal of Biotechnology*, 6: 167-174.
- Nwosu, C.I., Igugo, R.U and Uwadiogwu, N.C. (2020). Growth performance and hematological indices of finisher broilers fed varying levels of Bush Buck (*Gongronema latifolium*) leaf extract in drinking water. *Nigerian Journal of Animal Science*, 22(2):262-270.
- Olomu, J. M (2011). *Monogastric animal nutrition: Principles and Practice*, 2<sup>nd</sup> Edition. Jachem Publishers, Nigeria.

- Oluyemi, J.A. and Roberts, F.A. (2000). *Poultry production in warm wet climate*. 2<sup>nd</sup> edition, Spectrum books limited Ibadan, Nigeria. Pp77-80.
- Onu, P.N., Nwose, R.U., Obianwuna, U.E. and Ajah, C.A. (2016). Influence of aromatic plants supplemented goat blood rumen content mixture on the performance and feeding economics of finisher broilers. *Proceedings of the 21<sup>st</sup> Annual Conference of Animal Science Association of Nigeria (ASAN), Port Harcourt-Nigeria*. Pp 546-550.
- Rahman, M.M. and Yang, D.K. (2018). Effects of *Ananas comosus* leaf powder on broiler performance, hematology, biochemistry, and gut microbial population. *Revista Brasileira de Zootecnia*, 47, 1–6.
- Ravindran, V. (2013). Poultry feed availability and nutrition in developing countries: Main ingredients used in poultry feed formulations. In: Poultry Development Review. Food and Agriculture Organization. Pp 59 – 63.
- Steel R.G.D. and Torries, J.H. (1980). *Principle and procedure of statistics: A biometrical approach* (2<sup>nd</sup> Edition). McGraw- Hill Book co., New York.
- McDonald, P., Edwards, R. A., Greehalgh, J. F. D., Morgan, C. A., Sinclair, L. A. and Wilkinson, R. G. (2010). *Animal nutrition* (7th edition). Pearson. Pp50-100