Evaluation of Weight Gain of Abor- Acre Broiler Chickens Supplemented with *moringa Oleifera* pods, proboiotic, levamisole and vitamin E / Selenium.

Mohammed Murtala Kyari
mmkyari@gmail.com, +2347030610999

Department of Animal Health & Production Technology, Federal Polytechnic Bali, Taraba State, Nigeria.

Abstract

This study evaluates the effects of Moringaoleifera pods in comparison to probiotic, levamisole and vitamin E/Selenium on the growth performance of broiler chickens. A total of 100-day-old ABOR-ACRE broiler chicks of average weight of 38 grams were purchased from hatchery in Ibadan and used for this study. The chicks were randomly divided into 5 groups (A, B, C, D and E).Group A was fed basal diet supplemented Moringaoleifera pods powder at inclusion rate of 50g/kg, group B fed basal diet supplemented with commercial probiotic (Bactofort®) at 0.5g/kg, group C with commercial Vitamin E/Selenium (Vitamin E/Se®100/50) in drinking water for 3 days, repeated after 14 days, group D were given Levamisole (Wormcare®) in drinking water for 3 days, repeated after 14 days and group E served as control. Chickens in all groups were served same quantities of feed and water ad-libitum.The birds were weighed weekly and feed intake evaluated. Data were analyzed using simple descriptive statistics and two-way ANOVA. Results showed significant difference ($p<0.05$) weight gain of birds fed M. oleifera and probiotic. It was concluded that broilers diet containing M. oleifera pods powder improvelive body weight gain. It is recommended among others that M. oleifera pod supplementation at 50 g/kg can be used as growth promoter in broilers.

Keywords: *Moringaoleifera, Growth promoter.*

Introduction

Today's commercial broiler is the most efficient ever, representing the combined efforts of genetics and improved operational and managerial practices, with the most striking growth capability of 70-75g per day occurring in the first weeks (Leeson, 2008). Owing to continuous genetic selection of broilers for fast growth the rearing period necessary to reach the same live weight has been reduced (Gonzales *et al*., 2003; Gous, 2010). The efficiency in genetic modeling of poultry entails the ability to predict the bird's growth and development, which allows the prediction of its nutrient requirements (Zuidhof *et al*., 2006). This provides an insight into the efficient capability of the chick to digest feed and to cope with environmental and management stresses (Mateos *et al*., 2002).

Poultry production is practiced in all levels ranging from subsistence to large scale commercial operations. Poultry meat and eggs are the most consumed animal protein; unrestricted by any religion or culture in Nigeria. It was recorded that the poultry industry contributed about 25% of the country's Agricultural GDP (FAO, 2010). Nigeria presently produces above 550,000 metrictonnes of poultry meat per annum and 700,000 metric tonnes of eggs according to (FAO, 2010). Despite these, Nigeria is far from meeting her domestic demand when compared with developed countries that are involved in poultry production.

According to FAO (2010), the poultry expansion was 3.2% against global increase of 2.2%; Nigeria supply had increased beyond her domestic borders to countries like Cameroon, Togo, Benin Republic, Niger and many of her neighboring countries, but despite that Nigeria supply with respect to broiler production has not been consistent compared to layers production (FAOSTAT 2007).

Natural substances are viewed as a possible solution that would address public health concerns without compromising the efficiency of poultry production (Peric *et al.*, 2009). Plant additives, are often referred to as phytobiotics, a term used to describe plant-derived natural bioactive compounds that affect animal growth and health; mostly applied to essential oils, botanicals, and extracts derived from herbal plants (Kim *et al*., 2008; Windisch *et al*., 2008). Plant supplements are common dietary additives for humans, preferred for their non-toxic chemical composition, relatively low cost and easy availability (Cross *et al*., 2007). However, for use in animal diets, phytogenics, are a relatively new class of feed additives and knowledge with regards to their modes of action and aspects of their application is still rather limited (Windisch *et al*., 2008). Thepresent study was, planned to evaluate the weight gain of ABOR-ACRE broiler chickens supplemented with *Moringaoleifera* pods, probiotics, levamisole and vitamin E / selennium.

Objectives

i. To assess the effect of *Moringa oleifera* pods on body weight gain of broiler chickens.

ii. To compare the growth rate and weight gain of broiler chickens fed *Moringa oleifera* pods, probiotics, levamisole and vitamin E/ Selenium.

Statement of research problem

There are concerns being raised on the adverse effects of antibiotics and drugs residues in meat and poultry products. Information on the utilization of plant products alone and in combination in form of phytobiotic or phytomedicine as alternative to reduce overdependence on antibiotics (as growth promoters or for treatment) in poultry production is scanty in Nigeria. Also the use of sub-therapeutic dose ofantibiotic is still practiced in poultry industries either to control diseases or asa growth promoters. Despite the current use of a variety of alternative growth and production enhancers there is no single treatment or product that has been successful in replicating the relatively consistent and robust effects of AGPs (Dibner and Buttin, 2002). Another problem is that some additives such as vitamin E and selenium, which are usually added in mono-gastric feeds, are very expensive. Identifying naturallyoccurring alternatives, such as plants is a possible alternative. The effect of such alternatives on the growth performance, digestibility, digestive organ size, gut health, bone characteristics, as well as meat yield, and the quality and shelf-life of meat from broiler chickens is important for the poultry industry.

Justification

This widespread claim of *M. oleifera's* nutritional and medicinal properties on humans is encouraging further investigation of its use as an additive in chickens. This research will also help the broiler production industry by possibly coming up with an alternative to the synthetic antibiotics and growth promoters. The is more critical given that natural substances are viewed as a possible solution that would address public health concerns without compromising the efficiency of poultry production.

Moringa oleifera leaves have properties that make them a possible alternative in broiler production. Synthetic growth enhancers and supplements in poultry nutrition are expensive, usually unavailable and possess adverse effects in birds and human. Sub-therapeutic levels of antibiotics given to poultry as growth enhancers may result to the development antibiotic-resistant bacteria, which are hazardous to animal and human health (Ghazalah and Ali 2008).

Research hypothesis

Ho: There is no statistically significant difference in the body weight gain of broilers fed with *M. oleifera* pods, probiotic, vitamin E/Selenium and levamisole under experimental condition.

Material and Methods

Total of 100 one-day old (Abor-acre) broiler chicks, with average weight of about 38 gram were subjected to a 42-days experimental period. The chicks were

randomly divided into five experimental groups (Group A, B, C, D and E), each group with 20 chicks. The chicks were managed intensively in deep litter system with a floor of 0.024 to 0.10 square metre per bird. Continuous lighting was provided throughout the experimental period by placing 200 watts electric bulbs atcenter floor of each partition and adjusted by pulling it away from floor based on the response of chicks, weather condition and feather growth. The chicks in bothgroups were fed a broiler starter from day 1 to 28, and broiler finisher from day 29 to 42. The basal diets fed to the chicks in both groups were the same. The birds were provided with feed and water at-libitum and litter material changed two weeks apart. The treatments were as follows:

1. Group A: Basal diet + *Moringa* pods at inclusion rate of 50g/kg
2. Group B: Basal diet + Bactofort® probiotic, containing *Lactobacillus acidophilus* (77 × 10^9 cfu/kg), *Enterococcus faecium* (44 × 10^9 cfu/kg), *Saccharomyces cerevisiae* (5000 × 10^9 cells/kg), *Bacillus subtilis* (2.2 × 10^9 cfu/kg) at the rate of 0.5g/kg, the probiotic was used according to manufacturer's recommendation.
3. Group C: Basal diet + vitamin E and Selenium (VitE/Se® 100/50) at 2ml/4 litres for 3 days in drinking water and repeated after every 14 days according to manufacturer recommendation.
4. Group D: Basal diet + levamisole at 2ml/4 litres in drinking water for 3 days and repeated after 14 days.
5. Group E: Basal diet (Control)

During the experimental period the birds were weighed weekly and feed intake per experimental group was recorded at the same time. Feed intake per group was determined for each partition as the difference between the amount of feed supplied and the remaining feed at the end each week. Body weight and body gain were calculated as the difference between the final and initial bird weight. Feed conversion ratio (FCR) was calculated as the ratio between feed intake and body gain at the end of each week (NRC 1994).

Data Analyses

All data were expressed as means and their standard error of mean (SEM) using Graph Pad prism version 5.0, difference between group mean was determined using analysis of variance(ANOVA) followed by Tukey's post-hoc for multiple comparison test. Values of $p < 0.05$ was considered significant.

Result

Results of feed consumption and weight gain of broilers supplemented with *Moringa oleifera* pods, Probiotic, Levamisole, Vitamin E and Selenium is presented in table 1. The details of growth performance of broilers fed *Moringa oleifera* pods, Probiotic, Levamisole, Vitamin E and Selenium and Control are presented in

tables 2. During the growing and finishing periods, there was no statistical significant difference of the body weight gain among the groups at day 7 of age. The body weight gain of the chickens in group A was significantly higher (P≤0.05) than those in other groups at day 14 of age. Chickens in group A and those in group B were observed to have higher (P≤0.05) body weight gain compared to those in group C, D and E at day 21. However, from day 28 to 42, chickens in group A had higher (P≤0.05) body weight gain than those in groups. Chickens in group B had higher (P≤0.05) body weight gain than those in groups(C, D and E) at day 21 and 28 but there was decrease in weight gain at day 35 with increase in weight gain at day 42. There was no statistical significant difference in weight gain of chickens in group C than those in groups (D and E) at day 14 and 21. However, there was decrease in weight of group C chickens from day 28 to 42 of the experiment. Weight gain of chickens in group D does not differ from those in group E throughout the overall experimental period.

Table1: Feed consumption and weight gain of Abor acre Broiler chickens supplemented with *Moringa oleifera* pods, Probiotic, Levamisole and Vitamin E/ Selenium by Age (Days) in grams.

Age (Days)	**GROUP 'A'** (*M. oleifera*)		**GROUP 'B'**(Probiotic)		**GROUP 'C'**(Vit. E/Sel.)		**GROUP 'D'** (Levamisole)		**GROUP 'E'** (Control)	
	Feed Consumed	**Weight gained**	**Feed Consumed**	**Weight gained**	**Feed Consumed**	**Weight gained**	**Feed Consumed**	**Weight gained**	**Feed Consumed**	**Weight gained**
7	2037	219	2214	222	2108	190	2128	213	2201	204
14	3393	536	3548	524	3697	466	3568	499	3563	483
21	6233	925	6351	901	6425	780	6251	847	6348	816
28	9951	1150	1055	1129	1058	973	1040	1081	1049	1073
35	13113	1487	14568	1409	14532	1243	14507	1406	14605	1398
42	19498	1708	20953	1682	20918	1402	20889	1639	20990	1592

Table 2: Comparative effect of *Moringa oleifera* pods, Probiotic, Levamisole, Vitamin E and Sel enium supplementation on weight gain (MEAN±SEM) by age (days) of broiler chickens.

AGE (DAY)	A (n=10) (MORINGA)	B (n=10) (PROBIOTIC)	C (n=10) (VITAMIN E/ SELENIUM)	D (n=10) (LEVAMISOLE)	E (n=10) (CONTROL)
7	219 ± 3.33[a]	222 ± 4.50[a]	190 ± 1.93[a]	213 ± 2.67[a]	204 ± 5.14[a]
14	536 ± 10.62[b]	524 ± 5.31[a]	466 ± 7.77[a]	499 ± 8.77[a]	483 ± 4.62[a]
21	925 ± 11.51[b]	901 ± 7.50[b]	780 ± 22.59[a]	847 ± 9.96[a]	816 ± 2.38[a]
28	1150 ± 20.13[b]	1129 ± 5.0[b]	973 ± 6.59[b]	1081 ± 5.17[a]	1073 ± 3.55[a]
35	1487 ± 16.12[b]	1409 ± 32.60[a]	1243 ± 10.27[b]	1406 ± 10.40[a]	1398 ± 1.74[a]
42	1708 ± 30.42[b]	1682 ± 10.60[b]	1402 ± 21.63[b]	1639 ± 3.94[a]	1592 ± 5.82[a]

SEM= standard error of means

In each row, means with different superscript letters are significantly different (P≤0.05)

Discussion

The result of this study showed that *Moringa oleifera* pods inclusion to broiler diet had improved live weight gain on broiler chickens compared to control and this is in agreement with the work of Lannon, 2007 who reported that the performance of stabro broiler given *Moringa oleifera*leaf decoction revealed the improvement of feed consumption, daily weight gain, final weight gain and profit. And this also coincided with the work of Du *et al.,* (2007) who evaluated the effect of dietary supplementation *Moringa oleifera* on growth performance, blood characteristics and immune system of Arbor-acre strain of broiler. Also Yang *et al.*, (2007) evaluated the effect of *Moringa oleifera* on growth performance, immune function and ileum microflora in broiler. Result showed that dehydrated leaves of *Moringa oleifera* when given in diet, revealed significant enhancement of duodenum traits, increased lactobacillus counts in the ileum while reducing *Eschericia coli* and enhancement of immune system in broilers.

Probiotics supplementation to broiler diet had positive effect on weight gain compared to control. These results are in agreement with the findings of Yeo and Kim (1997) an Anjum *et al.*,(2005) who reported that the use of probiotic in chick's

diet significantly improved the daily weight and conversion efficiency.

Result showed that vitamin E/Selennium supplementation was related with body weight gain. The result is in agreement with findings of *Swain et al.,* (2000) who reported that supplementation of vitamins E/Selenium improves health and overall growth performance in boilers.

There is no significance difference observed between treatments with levamisole and the control group. This is in disagreement with the work of *Alishahi et al.,* (2012) who reported that levamisole had significant effect on weight gain.

Conclusions

Based the results obtained, the *Moringa oleifera* pods supplementation to the broiler diet had improved the live body weight (1.708 kg) at 42 weeks despite lowest feed consumption (19,498 kg). Vitamin E and Selenium adversely affected body weight gain of broiler (190-1402) throughout the period of study.Levamisole supplementation does not produce any significant difference on growth performance.

Recommendations

i. *M. oleifera* pod supplementation at 50 g/kg can be used as growth promoter in broilers.
ii. Further study should be carried out to determine the nutrient content of the *Moringa oleifera* pods.
iii. Inclusion rate below and above 50g/ kg should be used to determine most effective level of supplementation.
iv. Extracts of the *M. oleifera* pods should be used to evaluate its effect on growth performance and immune system.

References

Alishahi, M., Mesbac, M., Namjouyan, F., Sabzevarizadeh, M., Razi, J.M (2012). Comparison the effects of some chemical and natural immune stimulant on Oscar fish (*Astronotus ocellatus*). Iranian vet. Journal, 8(2), 58-59.

Anjum, I.M, Khan W., Zim A., and Afza M. (2005). Effect of dietry supplementation of multi-strain probiotic on broiler growth. Pakistan veterinary journal.

Cross, D.E., McDevitt, R.M., Hillman, K. and Acamovic, T. (2007).The effect of herbs and their associated essential oils on performance, dietary digestibility and gut micro-flora in chickens from 7 to 28 days of age.*British Poultry Science*, 48 (4): 496-506.

Dibner, J.J. and Buttin, D. (2002). Use of Organic Acids as a Model to Study the Impact of Gut Microflora on Nutrition and Metabolism.*Journal of Applied Poultry Research*, 11 (4): 453 – 463.

Du P.L, Lin P.H, Yang R.Y and Hsu J.C (2007).Effect of dietary supplementation of moringa oleifera on growth performance, blood characteristics and immune response in broilers.*Journal of Chinese Soceity of Animal Science*, 36(3): 135-146.

FAO (2010). Poultry meat and Eggs. Agribu siness handbook. Director of Investm

ent Centre Division.FAO. Rome. Italy. P. 77.

Ghazalah, A.A., and Ali, A.M. (2008). Rosemary leaves as dietary supplement for growth in broilers. *International Journal of Poultry Science*, 7(3): 234-239.

Gonzales, E., Kondo, N., Saldanha, E.S.P.B. , Loddy, M.M., Careghi, C. and Dec uypere, E.
(2003). Performance and physiologic al parameters of broiler chickens sub jected to fasting on the neonatal period.*Poultry Science*, 82: 1250 – 1256.

Gous R.M.,(2010), Nutritional limitation on growth and development in poult.

Kim, S.W., Fan, M.Z. and Applegate, T.J. (2008). Nonruminant Nutrition symposium on natural phytobiotics for health of young ani mals and poultry: Mechanisms and a pplication.
Journal of Animal Science, 86 (E. Supplement): E138 – E139.

Lannaon, W.J., (2007). Herbal Plants as Sou rce of Antibiotics for Broilers. *Agricult ure Magazine* 11(2): 55.

Leeson, S. (2008). Future Developments in Poultry Nutrition. *Carolina Feed Ind ustry Associatio-n 35th Poultry Nutrition Conference*, pp. 1 – 5.

Mateos, G.G., La´zaro, R. and Gracia, M.I. (2002). The feasibility of using nutritional modifications to replace drugs in poultry feeds. *Journal of Applied Poultry Research*, 11: 437 – 452.

National Research Council.(1994). Nutrition Requirement of Poultry (9th Ed.).National Academy Press, Washington D.C., USA.

Peric, L., Zikic, D. and Lukic, M.(2009). Application of alternative growth promoters in broiler production.*Biotechnology in Animal Husbandry*, 25 : 387 – 397.

Swain B.K, Johri T.S, Swain P. and Shrivastav A.K. (2000). Ind J. poult science 35(3): 247-51.

Windisch, W., Schedle, K., Plitzner, C. and Kroismayr A. (2008).*Journal of Animal Science*, 86 (E. Supplement): E140–E148.

Yang, R.Y., Chang, L.C., Hsu, J.C., Weng, BBC., Palada, M.C., Chadha, M.L. and Levasseur, V. (2007). Nutritional and Functional Properties of Moringa oleifera Leaves- From Germplasm, to Plant, to Health. in: Moringa Leaves: Strategies, Standard and Market for a Planning, ABU, Zaria, Nigeria, Pp. 1-5.

Zuidhof, M.J., Carney, V.L., Schneider, B.L., Renema, R.A., Robinson, F.E. and Betti, M. (2006).Broiler meat quality and yield dynamics.*Poultry Service Industry Workshop October*, 3rd – 5th, pp 79 – 88.