

## GROWTH PERFORMANCE OF BROILERS FED GRADED LEVEL OF AFRICAN PEAR (DACRYODES EDULIS) SEED MEAL

M.A. Onigemo, Tijani L.A, Agbalaya K.K. and Bello K.O

Department of Animal Production Technology

Lagos State Polytechnic, Ikorodu.

maonigemo@gmail.com

### Abstract

The average feed intake (AFI), average weight gain (WG), feed conversion ratio (FCR), protein efficiency ratio (PER) and specific growth rate (SGR) of ninety six (96) day old broilers fed with diet containing African Pear (*Dacryodes edulis*) seed meal (APSM) at 0%, 18%, 36% and 54% levels of inclusion representing 0%, 25%, 50% and 100% value of maize were investigated for 56 days. The varying levels of APSM significantly ( $P < 0.05$ ) enhanced the FCR and PER of the birds while it significantly ( $P < 0.05$ ) depressed their AFI, WG and SGR. Hence APSM cannot replace maize in the diets of broilers.

**Key words:** Growth performance, broilers, African pears seed meal.

### Introduction

Poultry meat is one of the major sources of animal protein in Nigeria, and the poultry industry has been contributing immensely towards the attainment of the Food and Agricultural Organization of United Nations minimum animal protein requirement of 35g/head/day in the nation (Dairo and Onigemo, 1997). This contribution is currently being undermined by the increasing cost and scarcity of conventional feed resources such as maize, soya bean meal, groundnut cake and fish meal (Dairo and Onigemo, 1997; Amata, 2014). Maize accounts for 60% or more of broiler feed and is the one of the major determinant of profit in the poultry industry, since feed constitutes 60-70% of the total cost of livestock and poultry production (Lawrence *et al.*, 2008). Hence, research efforts should be geared towards searching available alternative feed resources that will combat the rise in the cost of feeding farm animals and at the same time will not adversely affect the growth and welfare of farm animals (Ogunbameru *et al.*, 2004; Adeyemo and Longe, 2007). African pear is usually cultivated in agro forestry system serving as shade, secondary crop in cocoa plantation (Sonwa *et al.*, 2002). The flesh pericarp of the fruits are toasted or boiled for consumption while the seeds are often discarded. The seed has been reported to contain high soluble lipids and carbohydrates (Obasi and Okolie 1993; Ajayi and Oderinde., 2002; Bratte *et al.*, 2010). Obasi and Okolie (1993) reported that seed of African Pear contain 769 g/Kg Carbohydrates, 126 g/Kg of Lipids and has no toxic principles. This study was therefore executed to evaluate the effect of replacing maize with African pear seed meal on the growth performance of broilers so as to establish its suitability as an alternative energy source in livestock feed.

### Materials and Method

The research work was carried out at the brooder house of Department of Animal Production, Lagos State Polytechnic, Ikorodu, Lagos. The rejected African pear was obtained from Ayedere fruit market in Agboyi-Ketu, LDA of Lagos. The fleshy part was detached and the resulting seed was washed, sundried, deshelled and grinded into a meal using a hammer mill fitted with 2mm sieve. The African pear seed meal (APSM) was incorporated into the experimental diet at 0%, 18, 36%, and 54% levels as partial/total replacement for maize. Ninety six (96) day old broiler chicks were randomly allotted to the four dietary treatments with three replications each in a completely randomized design (CRD). Each replicate comprise eight (8) birds, which were fed with the experimental diets (Table 1) ad-libitum at 7:00, 14:00 and 18:00 hours of the day. All necessary management, medication and vaccination practices were religiously observed throughout the fifty six (56) days of the study. The experimental diets were analyzed for proximate composition in accordance with the method of the official analytical chemist (A.O.A.C., 2010). Data on feed intake and weight gain were collected weekly. Specific growth rate, feed conversion ratio and protein efficiency ratio was determined from the primary data as the difference between the natural log of the final weight and initial weight of birds divided time (days) between the weight; feed to gain ratio; and weight gain per protein consumed respectively. All data was subjected to analysis of variance test and all significantly different means were separated using Duncan Multiple Range Test, using Assistat 7.6 beta software developed by Silva and Azevedo, (2009).

## Results and Discussion

The increasing levels of APSM significantly ( $P < 0.05$ ) influenced the AFI, AWG, FCR, PER and SGR of the birds. The AFI, AWG and SGR decreased as the level of APSM was increased, significant negative relationships was observed between the varying levels of APSM and the aforementioned variables ( $r = -0.9965$ ,  $r = -0.9975$  and  $r = -0.9963$  respectively). The reduction in the amount of feed consumed by the birds with the increasing level of APSM might be attributed to the low palatability of APSM occasioned the mild turpentine smell of the seed (Orwa *et al.*, 2009) which tend to be pungent as the seed was dried and further processed. Palatability and flavor have been reported to influence voluntary feed intake in poultry (El Boushy *et al.*, 2000). The depressed weight gain and subsequent growth rate might be attributed to the low feed intake of birds on diets containing higher levels of APSM, since body weight gain depended directly on nutrient intake (Whittemore and Fawcett, 1976). However, the FCR and PER were significantly improved by the increasing levels of APSM since the required lesser feed per unit weight gain and gain more weight per unit protein intake respectively. The better utilization of nutrients by birds fed with higher levels of APSM might be attributed to the fact that it is free from anti-nutrients. Since the seed of African Pear has no toxic principles (Obasi and Okolie, 1993). Hence, the use of APSM in broiler ration could be beneficial if a means of reducing the off flavor and increasing the feed intake could be achieved.

## Conclusion

APSM enhanced feed utilization but depressed the growth of growing broilers due to low feed consumption; hence, APSM cannot replace maize in the diets of broilers.

## References

- Adeyemo, O.G and D.O Longe, 2007. The Reproductive Performance of a breeder cocks fed cotton seed meal cake-based diet. *J. Poult. Sci.* 2:140-144.
- Ajayi, I.A. and R.A. Oderinde, 2002. Studies on the oil characteristics of *Dacryodes edulis* pulp and seeds. *Discovery innovate*; 14:20-24.
- Amata I.A. 2014. Comparative Evaluation of The Growth Performance of the Giant African Snail *Archachatina Marginata* Fed a Formulated Diet and Three Selected Edible Vegetables. *Adv. Res. Agri. Vet. Sci.* 1(1): 1-5.
- AOAC 2010. Official Method of Analysis. 16th Ed. Association of Official Analytical Chemist. Washinton DC, USA.
- Bratte L., F.U.C Mmereole, O.J. Akpodiete and S.I. Omeje, 2010. The nutrient composition of seed of African pear (*Dacryodes edulis*) and its implication for non ruminant nutrition. *Pak. J.Nutr.*, 9:255-258
- Dairo, F.A.S. and Onigemo M.A. 1997. The Response of Broiler Birds to Diets Containing Graded Levels of Water Hyacinth (*Eichhornia crassipes*) Leaf Meal. *J. Agric. Tech.* 5(1): 56-62.
- El Boushy, A. R., Y. Van der and Poel, A. F. B., 2000. Handbook of poultry feed from waste: processing and use. Springer-Verlag New York, 428 p.
- Lawrence J. D., Mintert J., Anderson J D. and D. P. Anderson 2008. Feed Grains and Livestock: Impacts on Meat Supplies and Prices. *CHOICES*, 23(2): 11-15.
- Obasi, N.B.B and N.P Okolie, 1993. Nutritional constituent of the seeds of African pear *Dacryodes edulis* .*Food Chem.*46:297-299.
- Ogunbameru. A. Orowole P.F. and Onigemo M.A. 2004. The economy of partial replacement of maize with cassava meal in the diets of growing rabbits, *Laspotech. Journal of Technology*, 1 (2):179-184.
- Orwa, C.; Mutua, A.; Kindt, R.; Jamnadass, R.; Anthony, S., 2009. Agroforestry Database: a tree reference and selection guide version 4.0. World Agroforestry Centre, Kenya.
- Silva F. de A. S. e. and Azevedo, C.A. V. de. 2009. Principal Components Analysis in the Software Assistat-Statistical Attendance. In: World Congress on Computers In Agriculture, 7, Reno-NV-USA: *American Society of Agricultural and Biological Engineers*, 2009.
- Sonwa D.J., Okafor J.C., Mpungi Buyungu P., Weise S.F., Tchatat M., Adesina A.A., Nkongmeneck A.B., Ndoeye O. and Endamana D. 2002. *Dacryodes edulis*, a neglected non timber forest species for the agroforestry systems of West and Central Africa. *Forests, Trees and Livelihoods* 12(1/2): 41-55.
- Whittemore, C.T. and Fawcett, R.H., (1976). Theoretical aspects of a flexible model to simulate protein and lipid growth in pigs. *Anim. Prod.* 22, 87-96.

**Table 1: Composition of experimental diet**

| Feed Ingredients               | T1    | T2    | T3    | T4    |
|--------------------------------|-------|-------|-------|-------|
| Maize                          | 54    | 36    | 18    | 0     |
| African Pear                   | 0     | 18    | 36    | 54    |
| Groundnut Cake                 | 30    | 30    | 30    | 30    |
| Palm Kernel Cake               | 5     | 5     | 5     | 5     |
| Fish meal                      | 2     | 2     | 2     | 2     |
| Blood Meal                     | 3     | 3     | 3     | 3     |
| Bone Meal                      | 2.1   | 2.1   | 2.1   | 2.1   |
| Premix                         | 0.25  | 0.25  | 0.25  | 0.25  |
| Lysine                         | 0.1   | 0.1   | 0.1   | 0.1   |
| Methionine                     | 0.3   | 0.3   | 0.3   | 0.3   |
| Limestone                      | 1     | 1     | 1     | 1     |
| Salt                           | 0.25  | 0.25  | 0.25  | 0.25  |
| Palm oil                       | 2     | 2     | 2     | 2     |
|                                | 100   | 100   | 100   | 100   |
| <b>Calculated analysis</b>     |       |       |       |       |
| Crude Protein (%)              | 23.10 | 22.74 | 22.37 | 22.01 |
| Metabolizable Energy (Kcal/Kg) | 3057  | 3045  | 3034  | 3022  |

**Table 2: Growth Performance fed Diets Containing African Pear Seed Meal**

| Variables                | T1                 | T2                 | T3                 | T4                 | R       |
|--------------------------|--------------------|--------------------|--------------------|--------------------|---------|
| Average Weight Gain      | 25.43 <sup>a</sup> | 21.87 <sup>b</sup> | 16.57 <sup>c</sup> | 13.09 <sup>d</sup> | -0.9965 |
| Average Feed Intake      | 59.74 <sup>a</sup> | 50.25 <sup>b</sup> | 36.24 <sup>c</sup> | 24.51 <sup>d</sup> | -0.9975 |
| Feed Conversion Ratio    | 2.35 <sup>a</sup>  | 2.30 <sup>b</sup>  | 2.19 <sup>c</sup>  | 1.87 <sup>d</sup>  | -0.9281 |
| Protein efficiency Ratio | 1.84 <sup>a</sup>  | 1.91 <sup>b</sup>  | 2.04 <sup>c</sup>  | 2.43 <sup>d</sup>  | 0.9313  |
| Specific Growth Rate     | 4.97               | 4.37               | 3.31 <sup>a</sup>  | 2.32               | -0.9963 |