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Effect of Banana Peel Meal (*Musa sapientum* L.) on Carcass Characteristics and Haematological Parameters of Growing Rabbits in Semi- Arid Zone of Nigeria

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Abstract

Sixty (60) mixed sex cross breeds grower rabbits aged 4 – 7 weeks, with average initial weight of 770g, were used in this study to evaluate the effect of banana peel meal on their carcass characteristics and haematological parameters. The rabbits were assigned to four dietary treatments containing banana peel meal at 0%, 10%, 20% and 30% respectively in a Completely Randomized Design (CRD). There were significant ($p < 0.05$) differences in final weight, slaughtered weight, dressed weight, body length and kidney weight while loin, tail and length of gastro-intestinal segment showed no difference among the treatment groups. The result of the hematological parameters indicated that mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), neutrophil and basophil showed significant ($p < 0.05$) differences among the treatment groups. Packed cell volume (PCV), haemoglobin (Hb) concentration, red blood cell (RBC), white blood cell (WBC), mean corpuscular haemoglobin concentration (MCHC), lymphocytes, monocytes and eosinophils were similar among the treatment groups. It was concluded that up to 20% banana peel can be included in the diets of rabbits without adverse effects on carcass and blood indices.

Key words: Rabbit, banana peel, haematology and carcass

Introduction

In developing countries, the vast majority of the populace have low protein intake. These countries are mostly located in the tropics where the level of protein intake from animal sources represent about one tenth of the level of intake in some advanced countries (Alade *et al.*, 2002). Obioha (1975) and British Medical Association (1993) estimated the average protein intake of Nigerians to be about 8.27g per caput per day. To alleviate this protein malnutrition, rabbit production can be encouraged as a cheap and reliable source of animal protein (Mohammed, 2003).

Rabbits grow rapidly and their growth rate is comparable to that of broiler chicken (Rao, 1999). According to Checks (1999), rabbit meat has high biological value with high crude protein (21%), low fat (10%), low cholesterol, low sodium (0.25mg/g) and high proportion of linoleic and linolenic fatty acids. Despite these attributes of rabbits, their production has not received the desired attention in the tropics and productivity is usually 50% or less of what is typical in the temperate countries (Check, 1999). However, the adoption of proper nutritional strategies will greatly enhance the productivity of rabbits.

Banana peel is a major by-product in pulp industry and it contains various bioactive compounds like polyphenols, carotenoids and other compounds that are important in human and animal metabolism (Blandon *et al.*, 2015). Ripe banana peel contains up to 8% crude protein, 6.2% crude fat, 13.8% soluble sugars and 4.8% total phenolic compounds (Bakshi and Wadhwa, 2013). Similarly, Emega *et al.* (2007) reported that banana peels are rich in fibre (40 – 50%), protein (8 – 11%) and lipids (2.2 – 10.9%).

The objectives of this study were therefore to assess the effect of feeding graded levels of Banana Peels Meal on carcass characteristics of growing rabbits.

Materials and Methods

The experiment was carried out at the University of Maiduguri Teaching and Research Livestock Farm, Department of Animal Science, University of Maiduguri, Borno State, Nigeria. Sixty (60) mixed sex, crossbred rabbits aged 4 – 5 weeks were randomly allocated to four treatments in a completely randomized design experiment with 15 rabbits per treatment. Each treatment was replicated three times. The rabbits were housed in individual cages measuring 36cm x 45cm. Banana peels were obtained from banana vendors around Maiduguri town. The peels were then dried under shade and subsequently milled to obtain the banana peel meal (BPM) which replaced maize in the diets at 0%, 10%, 20% and 30%. Experimental diets and clean drinking water were provided *ad-libitum* throughout the eight weeks experimental period. At the end of the 8th week, 5ml blood was

collected from one rabbit per replicate from the largest vein of the ear by using a hypodermic needle. The samples were subsequently used to determine haematological and biochemical parameters. Similarly, a rabbit was slaughtered from each replicate and used to collect data on carcass characteristics. All data collected were subjected to analysis of variance using Statistix 8.0. (Statistix, 2003).

Results and Discussion

The effect of graded levels of banana peels in the diet on carcass characteristics of rabbits is presented in Table 1. All the variables measured in this study differ significantly ($p < 0.05$) except dressing percentage, weight of loin and tail, which were similar among the treatment groups. Inclusion level up to 30% depressed all the measured parameters. This is an indication that at high levels of inclusion, rabbits are unable to utilize the nutrients in banana peel meal. The dressing percentages in this study are similar to 55- 68% reported by Fanimo *et al.*(1996). Organ weights and length of gastro-intestinal segment of rabbits fed graded levels of banana peels are presented in Table 2. There were no differences in all the parameters measured except kidney weight which had no definite pattern. The length of the stomach, small intestine, large intestine and caecum were ($p > 0.05$) similar among the treatment groups.

The haematological parameters of rabbits fed graded levels of banana peel are presented in Table 3. All the observed variables were similar ($p < 0.05$) except MCV, MCHC and neutrophils which were significantly lowered by inclusion of banana peel meal up to 30% in the diet. However, all the values were within the range for a healthy rabbit (Anon, 1980).

Table 1. Carcass characteristics of rabbits fed graded levels of banana peels

Parameters	0%	10%	20%	30%	±SEM
Life Weight	1316.70 ^a	1416.70 ^a	1366.70 ^a	1001.70 ^b	69.28*
Slaughter weight	1250.00 ^a	1366.70 ^a	1316.70 ^a	943.36 ^b	68.53*
Dressed weight	765.22 ^a	752.33 ^a	710.33 ^{ab}	500.67 ^b	64.09*
Dressing (%)	59.22	55.25	53.00	52.33	2.89
Body length	34.33 ^a	30.00 ^{ab}	29.00 ^{ab}	29.33 ^b	1.93*
Shoulder	16.02 ^a	15.98 ^a	14.86 ^a	15.58 ^b	0.84*
Rack	8.40 ^a	7.05 ^a	6.05 ^{ab}	6.75 ^b	0.46*
Loin	9.15	8.37	9.32	6.96	0.29
Thigh	18.99 ^{ab}	18.85 ^a	18.61 ^{ab}	18.09 ^b	0.42*
Skin	6.50 ^b	8.59 ^a	7.68 ^a	7.88 ^{ab}	0.45*
Tail	0.56	0.63	0.53	0.78	0.11
Feet	2.37 ^{ab}	2.39 ^{ab}	2.35 ^{ab}	2.86 ^b	0.23*

a, b, cMeans in the same row bearing different superscripts differ significantly ($p < 0.05$); SEM = Standard error means.

Table 2: Organs weight (g) and length of gastro-intestinal segment of rabbits fed graded levels of banana peels

Parameters	0%	10%	20%	30%	±SEM
Liver weight (g)	36.00	40.00	41.33	31.67	5.17
Kidney weight (g)	9.67 ^{ab}	11.67 ^a	10.00 ^{ab}	8.00 ^b	0.75*
Heart weight (g)	4.00	4.00	4.00	3.33	0.44
Lungs weight (g)	9.33	9.33	9.00	7.33	1.34
Mean length of Gastro- intestinal segments (cm)					
Stomach	9.00	8.67	8.67	9.67	0.37
Small Intestine	145.00	191.33	169.00	166.00	13.64
Large Intestine	106.33	110.67	101.33	106.67	16.84
Caecum	45.67	52.67	53.67	55.33	9.02

a, b, cMeans in the same row bearing different superscripts differ significantly ($P < 0.05$); SEM = Standard Error Means.

Conclusion

It was concluded that banana peel meal can replace up to 20% maize in the diets of rabbits without adverse effect on carcass characteristics and blood components.

Table 3: Haematological parameters of rabbits fed graded level of banana peel

Parameters	0%	10%	20%	30%	±SEM
PCV (%)	36.00	42.33	38.00	36.67	4.07
Hb (g/dl)	12.37	14.87	12.67	12.30	1.53
RBC (x10 ³ /mm)	6.06	6.88	6.25	6.79	0.53
WBC(x10 ³ /mm)	8.63	10.33	9.07	8.43	1.32
MCV (fl)	58.33 ^a	61.50 ^{ab}	61.07 ^{ab}	54.47 ^b	1.98*
MCHC (Dg)	19.97 ^a	21.57 ^{ab}	20.20 ^{ab}	17.67 ^b	0.78*
MCHC (g/dl)	34.20	35.07	33.20	32.17	0.85
Neutrophils (%)	43.33 ^a	36.67 ^{ab}	51.00 ^{ab}	40.33 ^b	3.54*
Lymphocytes (%)	50.00	53.33	40.33	52.67	3.81
Monocytes (%)	4.00	5.67	40.33	3.33	0.74
Eosinophils (%)	2.33	3.67	3.00	3.67	0.88
Basophils (%)	0.00 ^a	0.67 ^{ab}	1.33 ^b	0.00 ^b	0.32*

^{a, b, c}Means within the same row with different superscripts differ significantly (P<0.05); SEM = Standard error of means.

References

- Alade, N.K., Igwuebuike, J.U. and Lawan, A. (2002). Effect of referring proportion of wheat bran on growth performance of rabbit fed carcass component of growing rabbits. *J. Sust. Agric. Env.*, 4 (1): 1 – 7.
- Bakshi, M.P.S. and Wadhwa, M. (2013). Evaluation of cannery and fruit wastes as livestock feed. *Indian J. Anim. Sci.*, 83(11): 1198 – 1202.
- Blandon, J.C., Hamady, G.A.A. and Abdel-Moneim, M.A. (2015). The effect of partial replacement of yellow corn by banana peels with or without enzymes on broiler's performance and blood parameters. *J. Appl. Poult. Sci.*, 4(1): 10 – 19.
- British Medical Association (1993). Basic Food and Nutrient Requirement for Africa. In the World Book of Encyclopedia International. 7: 310 – 311.
- Checks, P.R. (1999). The potential role of rabbit in meeting world food need. *J. Appl. Rabbit Res.*, 36: 3 – 5.
- Emega, H.T., Bindelle, J., Agneensens, R., Buldgen, A., Wathelet, B. and Paquot, M. (2007). Effects of the stage of maturation and varieties on the chemical composition of banana and plantain peels. *Food Chem.*, 103: 590 – 600.
- Fanimu, A.O., Oduronbi, F.O. (2006). Nutrition value of unripe plantain (*Musa paradisiacal*) peels for weaning rabbits. *Nig. J. Anim. Prod.*, 3(1 - 2): 9 – 15
- Mohammed, G. (2003). Inclusion of different level of dried goat rumen content in diets of growing rabbit in the semi-arid zone. M.sc Dissertation University of Maiduguri, Nigeria
- Obioha, F.C. (1992). A guide to poultry production in the Tropics. Acena publication. Enugu.
- Rao, D.R. (1999) Comparative performance of rabbits and broiler chickens. *Nutr.Repor. Int.*, 16: 133 – 135.
- Statistix (2003). Statistics for windows manual: Analytical software version 8.0 copyright 1985 – 2003.