

AN EVALUATION OF THE HEAMATOLOGY AND APPARENT DIGESTIBILITY OF BROILER CHICKEN FED SOAKED AND BOILED MANGO SEED KERNEL MEAL

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ABSTRACT

This study was design to carry out the evaluation of the heamatology and apparent digestibility of broiler chicken fed soaked and boiled mango seed kernel. A total of two hundred and ten (210) four to five weeks old birds were used for this study. There were five treatments and three replicates, each replicate having 14 birds in a completely randomized design. The birds were housed in pens under the deep litter system. Routine medications were administered. The birds were also fed diets containing 25% of soaked and boiled mango seed kernel meal (MSKM). The result showed no significant difference in all the haematological parameters analyzed for, the values were within the normal range for broilers chicken. Results of apparent digestibility of broiler finisher fed mango seed kernel meal showed no significant differences in all the parameters monitored. Values of the dry matter were higher in all the treatments except the treatment (T5) with boiled mixed samples of mango seed. This study revealed that 25% of broiler diet can be replaced with MSKM processed by boiling and soaking without adverse effect.

INTRODUCTION

Despite the acknowledge importance of poultry production in human nutrition, Akanni (2007) opined that it is characterized by low production level due to limited finance for the procurement of basic poultry equipment and materials. Feeding chickens is another greater challenge to poultry farmers as a result of the continue increase in the price of feed ingredients. The result of this is that many poultry farmers are not encouraged to increase their productivity. Using mango seed kernel as a feed ingredient for chickens has been explored by most researchers (Abdulahi *et al.* 2012). It becomes pertinent to investigate it effect on the haematology of the birds and also to evaluate how digestible it nutrients could be because of the anti nutrient mango seed is believed to contain. According to Oyawoye and Ogunkunle (2004) haematological components which consist of red blood cells, white blood cells or leukocyte, mean corpuscular haemoglobin and mean corpuscular haemoglobin concentration among others are valuable in measuring toxicity, especially, with feed constituents that affect the blood as well as the physiological and health status of farm animals. Apparent digestibility evaluation is also a valuable means of measuring efficiency of nutrient utilization in poultry. This study was therefore design to carry out the physiological

evaluation of the heamatology and apparent digestibility of broiler chicken fed soaked and boiled mango seed kernel.

MATERIALS AND METHODS

Experimental Site: This research was carried out at the poultry unit of the Department of Animal Science Ahmadu Bello University, Samaru, Zaria located at the Northern guinea savannah about 640m above sea level.

Sources and processing of the mango seed kernel (msk) meal: Mango Seed Kernel (a single local (kanbiri) and mixed samples of Mango Seed Kernel respectively) were collected in the month of April and May from various locations in Kaduna State such as Zaria City, Sabon Gari, Soba and Giwa. The two different samples were obtained by cutting the seed coat using a knife and / or crushed with a stone. The Mango Seed Kernel (MSK) obtained was divided into two parts. One part was soaked for 72 hours with water being changed at intervals of 8 hours while the other part was boiled in 100°C water for 30 min.

Experimental diets: Five broiler starter diets were formulated. Diet 1 was the control, diets 2 and 3 were soaked and boiled local (kanbiri) variety, while diets 4 and 5 were soaked and boiled mixed samples. 60% of MSKM was included in the diets as replacement of maize. The diets were formulated to be isocaloric and isonitrogenous (CP

= 23%, ME = 2900kcal/kg). The diets were also formulated to meet the requirements for energy, protein, calcium, phosphorus and lysine for broiler starter (NRC, 1994).

Experimental Animals and Management: A total of two hundred and ten (210) four to five weeks old birds were used for this study. There were three replicates, each replicate having 14 birds in a completely randomized design. The birds were housed in pens under the deep litter system. Routine medications were administered.

Haematological Evaluation: At the end of the experiment when the birds were 9 weeks, 2 ml of blood was collected through the wing vein of each bird per replicate, in to sterile universal bottles containing anti-coagulant ethylene diamine tetra acetic acid (EDTA). The samples were sent to the Clinical Pathology laboratory, Ahmadu Bello University Teaching Hospital, Shika, Zaria, for the analysis of full and differential blood count.

Digestibility Trials: One week (8th week) to the termination of the experiment, three birds were selected from each treatment and caged. The birds were given a known quantity to diet daily and faecal sample was collected daily, weigh and oven dried. The samples were analyzed for proximate composition in the biochemistry lab of the department of animal science Ahmadu Bello University Zaria. Nutrient retention was calculated using the formula below

Statistical Analysis: Data obtained from all the experiments were subjected to analysis of variance, using the general linear model procedure of SAS (2001). Significant differences among treatment means were separated using the Duncan's multiple Range Test in the SAS package.

RESULTS AND DISCUSSION

The results on the effect of mango seed kernel on PCV and erythrocytic index (Table-1) showed no significant differences in the hematological (packed cell volume, hemoglobin concentration, red blood cell count, mean corpuscular volume and mean corpuscular haemoglobin concentration).

All the blood parameters analyzed were comparable to values reported in literature as normal for chickens (MVM 1986; Faniyi 2002). This similarity in the blood parameters between treatments and their normal values are indications of nutritional adequacy of all the diets. A

significant ($P < 0.05$) increase was noticed in the mean corpuscular haemoglobin concentration which could be attributed to possible bone marrow stimulation. Since the blood profile offers a valuable investigation and explanatory tool in nutritional assessment and health implications (Olorede *et al.*, 1995; Odunsi *et al.*, 1995) there is evidence to further indicate that dietary tannin levels were below the thresholds as reported by (Smith 2001). The results on the effect of mango seed kernel on white blood cell and its differentials (Eosinophil and lymphocyte) showed no significant differences in all the differentials analyzed for. All the white blood parameters analyzed were comparable to values reported in literature as normal for chickens (MVM 1986). This similarity in the blood parameters between treatments and their normal values are indications of nutritional adequacy of all the diets. A significant level of increase was noticed in the total white blood cell which could be attributed to possible bone marrow stimulation and immune stimulation (Talebi *et al.*, 2005). Haematological values are indirect pointers to the health of live stocks (Kecceci *et al.*, 1998) and are further modified by several other factors including diets (Talebi *et al.*, 2005) and high levels of anti nutritional factor example tannin.

Results of apparent digestibility of broiler finisher fed mango seed kernel meal showed no significant differences in all the parameters monitored. Values of the dry matter were higher in the treatments except the treatment (T5) with boiled mixed samples of mango seed. Treatment five however recorded a higher value for ether extract and NFE compared to other treatments. The values of the apparent digestibility were an indication of better utilization of the nutrients. However, there was a decline in the utilization of crude fiber and ash by birds that were fed mango seed meal. The poor apparent digestibility and poor performance of birds fed diets containing mango seed kernel agrees with the report of Dafwang, (2001) that most farm waste used as non-conventional feed resources are poor in readily digestible feed nutrients. Mbajuniwa (1995) also reported the leaching of soluble minerals in water when mango seed kernel was boiled hence reducing the available mineral to the birds.

Conclusion

Birds fed with diets containing mango seed kernel meal were not affected by the diets as their haematological parameters were within the normal range for broiler birds. Nutrients from the MSKM were well utilized with a limitation on the proper utilization of fibre and ash. It is recommended that MSKM should be improved either with enzyme for proper utilization of the nutrients in the meal, and the seed can be used at 25% in broiler diets without adverse effects on the birds.

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Table 1 Haematological of Broiler Chicken fed Mango Seed Kernel Meal

Parameters	Control	Kabiri seed		mixed seeds		SEM
		Soaked	Boiled	Soaked	Boiled	
PCV (%)	32.67	31.00	32.67	29.33	31.67	10.616
MCV(μ^3)	56.67	60.00	60.00	60.00	60.00	0.667
MCH1 (g)	20.00	20.00	20.00	20.00	20.00	0.00
MCHC1(g%)	178.97 ^c	203.93 ^{ab}	203.13 ^{ab}	220.20 ^a	218.47 ^{ab}	6.154
TWBC($\times 10^6/l$)	52.07a	47.62b	44.78	51.24ab	42.47	1.29
E	4.00	3.33	2.67	2.67	3.33	1.15
L	37.67	31.00	31.00	32.67	27.67	6.118

PCV= Pack Cell Volume; MCV= Mean Corpuscular Volume; MCH=Mean Corpuscular Haemoglobin; MCHC= Mean Corpuscular Haemoglobin Concentration; TWBC= Total White Blood Cell, E= Eosinophil, L= Lymphocyte

Table 2 Apparent Digestibility of Broiler Chicken fed Mango Seed Kernel Meal

Parameters	Control	kabiri seed		mixed seeds		SEM
		Soaked	Boiled	Soaked	Boiled	
Dry matter	84.50 ^a	85.16 ^a	84.10 ^a	84.15 ^a	80.84 ^b	0.54
Crude protein	92.45 ^a	90.69 ^b	89.44 ^b	86.98 ^c	89.74 ^b	0.52
Crude fiber	56.36 ^a	44.38 ^b	40.91 ^b	41.58 ^b	45.52 ^b	1.73
Ether extract	75.77 ^b	91.08 ^a	90.53 ^a	88.75 ^a	87.29 ^a	1.24
Ash	47.26 ^a	46.61 ^a	42.77 ^a	44.39 ^{ab}	42.52 ^b	0.90
NFE	70.44 ^{ab}	62.03 ^b	63.71 ^b	59.97 ^b	79.37 ^a	3.29