



# NSAP

47<sup>th</sup> Annual  
Conference  
(JOS 2022)

## CONFERENCE PROCEEDINGS

THEME  
SECURING ANIMAL  
AGRICULTURE AMIDST  
GLOBAL CHALLENGES

### EFFECTS OF FEEDING DIETS CONTAINING VARYING LEVELS OF PEARL MILLET SUPPLEMENTED WITH ENZYME ON BROILER PERFORMANCE

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#### ABSTRACT

A feeding trial was conducted to determine the effect of feeding pearl millet supplemented with Natuzyme<sup>TM</sup> on the performance of broilers. A total of 150 2-week old broilers of mixed sexes were randomly allocated to five diets in a completely randomized design. The broiler starter chicks were allocated one of five diets containing 0 (Control), 10.00, 20.00, 30.01 and 37.41% of pearl millet for diets A, B, C, D and E respectively. The starter diets were isonitrogenous (23% CP) but decreased in energy levels from 2,640.46 (Diet A), 2,608.64 (Diet B), 2,576.51 (Diet C), 2,544.36 (D) to 2,525.33kcal/kg ME (Diet E). The finisher diets were also isonitrogenous at 21% CP with each diet replicated three times. The finisher diets contained pearl millet at 0 (control), 10.64, 21.28, 31.92 and 39.29% in diets A, B, C, D and E respectively. The energy levels of the finisher diets decreased from 2656.47 (diet A) to 2530.80 kcal/kg ME (diet E). All diets containing pearl millet were supplemented with Natuzyme<sup>TM</sup> at 100g/100kg feed. Feed and water were administered ad libitum for six weeks. Overall result showed that feed intake (4.75, 4.57, 4.60, 4.61, 4.67kg), weight gain (2.21, 1.99, 1.87, 2.26, 2.16kg), feed conversion ratio (2.34, 2.31, 2.46, 2.07, 2.20) and feed cost per kg gain (₦51.85, ₦52.33, ₦54.74, ₦45.20 and ₦46.74) were not significantly affected by the diets. Therefore, pearl millet could be substituted in broiler diet at 100% granted the diet is supplemented with exogenous enzyme. Moreover, the diet with 100 percent pearl millet was cheaper than the control and it is recommended.

**Key words:** pearl millet, Natuzyme<sup>TM</sup>, broiler birds.

#### INTRODUCTION

Pearl millet (*Pennisetum glaucum*) is native to the western edges of the Sahara Desert and is commonly grown as a forage and grain crop in arid areas of Africa and India. It grows well under conditions of erratic rain, high temperatures and it does not contain major anti nutritional factors (Choct, 2006; Mehri *et al.*, 2010). The presence of non-starch polysaccharides (NSP) in pearl millet grains makes it antinutritive and one way of countering the effect of the water soluble NSP and consequently improving their nutritive value is by enzyme supplementation (Afsharmanes *et al.*, 2015). Lakurbe *et al.* (2019) fed broilers with diets containing sorghum (SK-5912), pearl millet and their combinations and reported no significant difference in the performance of broiler chicks. Similarly, Mohammed *et al.* (2014) reported that feed intake, feed conversion ratio and feed cost per kg gain were not affected by the diets containing pearl millet and detoxizyme and pearl millet and phytonics.

#### MATERIALS AND METHODS

##### *Source of pearl millet and Experimental diets*

Pearl millet was purchased from feed retail outlets in Bukuru, Jos South LGA of Plateau State, Nigeria. They were obtained dry and incorporated into the diets of broilers. Five isonitrogenous (23% CP) broiler starter diets containing graded levels [0 (control), 10, 20, 30.01 and 37.41%] of pearl millet were used in this study as shown in Table 1. All diets containing pearl millet were supplemented with Natuzyme<sup>TM</sup> at the rate of 100g/100kg of the diet. The starter diets contained metabolizable energy (ME) levels; 2,640.46, 2,608.64, 2,576.51, 2,544.36 and 2,525.35kcal/kg ME respectively. The finisher diets contained graded levels (0 (control), 10.64, 21.28, 31.92 and 39.27%) of pearl millet designated A, B, C, D and E respectively. The energy levels of the finisher diets ranged from 2,656.47, 2,622.53, 2588.39, and 2554.36 to 2530.80kcal/kg ME respectively (Table 2).



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**Table 1: Composition of experimental starter diets**

\*Hi Nutrient premix supplied the following per 100kg of diet: Vitamin A, 1,200,000 I.U; Vitamin D<sub>3</sub> 250,000 I.U; vitamin E, 3,000 I.U; Vitamin K, 200mg; Thiamin, (B<sub>1</sub>) 225mg; Riboflavin, (B<sub>2</sub>) 600mg; Pyridoxine (B<sub>6</sub>), 450mg; Niacin, 4000mg; Vitamin B<sub>12</sub>, 2mg; Pantothenic acid, 1,500mg; Folic

Ingredients	A	B	C	D	E
Maize	40.01	29.19	18.34	7.48	-
Soya bean cake	34.11	34.96	35.96	35.81	35.89
Pearl millet	-	10.00	20.00	30.01	37.41

Common ingredients in the diet are wheat offal (10.00), palm kernel cake (10.00), fish meal (2.00), bone meal (2.50), lime stone (1.50), premix (0.25), salt (0.25), methionine (0.10), Natuzyme™ (0.10) and lysine (0.10).

**Calculated composition:**

CP (%)	23.00	23.00	23.00	22.99	22.80
ME (kcal/kg)	2640.46	2608.64	2576.51	2544.36	2525.33
Ca (%)	1.68	1.71	1.73	1.69	1.69
P(%)	0.73	0.76	0.79	0.81	0.83
CF(%)	5.01	5.69	5.68	7.05	7.55
Feed cost/kg diet	110.56	108.97	107.40	100.82	104.41

\*Hi Nutrient premix supplied the following per 100kg of diet: Vitamin A, 1,200,000 I.U; Vitamin D<sub>3</sub> 250,000 I.U; Vitamin E, 3,000 I.U; Vitamin K, 200mg; Thiamin, (B<sub>1</sub>) 225mg; Riboflavin, (B<sub>2</sub>) 600mg; Pyridoxine (B<sub>6</sub>), 450mg; Niacin, 4000mg; Vitamin B<sub>12</sub>, 2mg; Pantothenic acid, 1,500mg; Folic acid, 150mg; Biotin, 8mg; Choline chloride, 30,000mg; Anti-oxidant, 12,500mg; Manganese, 8,000mg; Zinc, 5,000mg; Iron, 2,000mg; Copper, 500mg; Iodine, 100mg; Selenium, 20mg; Cobalt, 50mg. Key: C.P, crude protein; M.E, metabolizable energy; Ca, calcium; P, phosphorus; C.F, crude fibre. NB, it is total phosphorus

**Table 2: Composition of experimental finisher diets**

Ingredients	A	B	C	D	E
Maize	42.56	31.04	19.50	7.97	-
Soya bean cake	26.71	27.64	28.52	29.41	30.03
Pearl millet	-	10.64	21.28	31.92	39.29

Common ingredients in the diet are wheat offal (10.00), palm kernel cake (10.00), fish meal (2.00), bone meal (2.50), lime stone (1.50), premix (0.25), salt (0.25), methionine (0.10), Natuzyme™ (0.10) and lysine (0.10).

All percentages are over 100.

**Calculated composition:**

CP (%)	21.00	21.00	21.00	21.00	21.00
ME (kcal/kg)	2656.47	2622.53	2588.39	2554.36	2530.80
Ca (%)	1.69	1.68	1.69	1.69	1.69
P (%)	0.69	0.73	0.75	0.64	0.72
CF(%)	5.12	5.84	6.56	7.29	7.99
feed cost/kg	105.48	103.80	102.12	100.44	99.28

acid, 150mg; Biotin, 8mg; Choline chloride, 30,000mg; Anti-oxidant, 12,500mg; Manganese, 8,000mg; Zinc, 5,000mg; Iron, 2,000mg; Copper, 500mg; Iodine, 100mg; Selenium, 20mg; Cobalt, 50mg. Key: C.P, crude protein; M.E, metabolizable energy; Ca, calcium; P, phosphorus; C.F, crude fibre.

**Birds, housing and management**

One hundred and fifty, 2-week old broilers of mixed sexes of the strain (Arbor Acre) having a trade name Agrited' were obtained from a local commercial hatchery in Yola, Adamawa State, Nigeria. They were



uniform in size and housed in deep litter house, partitioned into 15 pens with wire mesh for adequate ventilation. At the starter phase, the birds in each group were offered one each of the five diets containing levels of pearl millet (Table 1) at thirty birds per diet. The birds were randomly allocated to the dietary treatments in a completely randomized design. They occupied 15 pens with 10 birds per pen. All birds from each unit were weighed at the beginning and weighed weekly. All vaccination (Newcastle disease intra ocular, two stages of gumboro vaccine, Newcastle disease LaSota) schedules and management procedures (antibiotic/antistress, anticoccidial drugs) were strictly adhered to. Feed and water were given *ad libitum* for two weeks. At the finisher phase, 30 birds per treatment were randomly allotted to the finisher diets in a completely randomized design. Each diet was replicated three times with ten birds per replicate. Feed and water were given *ad libitum* for the remaining four weeks of the finisher phase.

**Data Collection and analysis:** The mean weekly feed intake and body weights were recorded throughout the experimental period. A specified quantity of feed was given to the birds and the corresponding left over weighed. The difference between feed supplied and left over was taken as feed intake. The difference between the initial and final body weight was the weight gain. From the mean body weight gain and feed intake, feed conversion ratio was calculated. Feed cost/kg gain and feed cost/kg diet was calculated from prevailing local market price of feed materials. Data collection was subjected to analysis of variance; ANOVA (Steel and Torrie, 1980) and where significant differences occurred, means were separated by Duncan's new multiple range test (Obi, 1990).

Table 3. Analyzed composition of pearl millet (%)

Crude protein	Ash	Moisture	Crude fibre	Ether extract	Carbohydrate
5.98	3.12	3.99	8.43	4.93	81.99

## RESULTS AND DISCUSSION

The proximate analysis was conducted according to procedures of AOAC (2010). The crude protein, ash and carbohydrate are close to 7.52, 1.68 and 74.14 reported by Adewale *et al* (2017). Variations in crude fibre and moisture may be due to cultivar differences or to change in weather. Even the crude fibre of 2-4% reported by Abdalla *et al* (1998) is still lower and may be due to different variety used. The growth performance of broiler chickens fed graded levels of pearl millet meal-based diets is presented in Table 3. Feed intake, weight gain and feed conversion ratio did not differ significantly ( $p>0.05$ ) across the diets. Feed cost per gain also followed similar trend with feed conversion ratio. Mohammed *et al.* (2014) fed diets containing pearl millet meal to broiler chickens and observed that feed intake, feed conversion ratio and feed cost per gain were not affected by the diets at the starter phase which is consistent with the findings of this study. However, they observed that in finishing birds, feed intake was significantly ( $P<0.05$ ) higher in chickens fed the control diet compared to others. This is slightly different from what was observed in the present study probably because they combined enzymes and phytogetic feed additive to the diets.

The report by Lakurbe *et al.* (2019) supported the result of this study. They reported that performance of the birds was similar between those fed pearl millet-based diet, sorghum, combination of both ingredients and the control group. Similarly, Bulus *et al.* (2014) reported that performance of broiler birds on the complete replacement of maize with pearl millet, finger millet and yellow guinea corn diets did not impair feed intake, weight gain, feed conversion ratio and nutrient retention as was observed in this study.

## CONCLUSION

The effect of feeding diets containing pearl millet supplemented with enzyme to meat type birds was studied. Feed intake, weight gain, feed conversion ratio and feed cost per kg gain did not differ significantly across the



Parameters	A	B	C	D	E	SEM
Initial weight (kg)	0.35	0.34	0.34	0.31	0.32	0.03NS
Final weight (kg)	2.20	2.31	2.24	2.22	2.26	2.08NS
Weight gain(kg/bird)	2.21	1.99	1.87	2.26	2.16	0.44NS
Feed intake (kg/bird)	4.75	4.57	4.60	4.61	4.67	0.18NS
Feed/ gain ratio	2.34	2.31	2.46	2.07	2.20	0.41NS
Feed cost/gain (₦)	51.85	52.33	54.74	45.20	46.74	8.98NS

a,b,c, means with similar superscript letters within rows are not significantly different ( $p>0.05$ ). There was no problem of mortality except one among treatment A.

treatments. Even though the differences in feed cost per diet were not significant across the diet, the cost of feed was evidently reducing with increasing content of pearl millet. Therefore, it is recommended that broiler diets may contain pearl millet up to 100% of the diet granted that the diet is supplemented with exogenous enzyme.

**Table 4. Performance of broiler chickens fed diets containing pearl millet**

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