

PHYSIOLOGICAL RESPONSES OF STARTER BROILERS FED DIETS CONTAINING GRADED LEVELS OF CASSAVA (*Manihot esculenta*) PEEL MEAL SUPPLEMENTED WITH ENZYME

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ABSTRACT

A 4-week feeding trial was conducted to investigate the physiological responses of starter broilers fed cassava peel meal (CPM) based diets supplemented with multigrain multienzyme. 180 starter broilers of Arbor acre strain were randomly allotted to five dietary treatments consisting of three replicates of 12 birds each. Five on-farm diets containing 0 (control), 6, 12, 18, and 24% CPM replacing maize coded as T1, T2, T3, T4, and T5, respectively, were formulated. All parameters measured were significantly different ($P < 0.05$). Physiological responses showed that heart rate varied from 239.00 to 347.00 beats/minute; respiratory rate range from 55.67 to 94.33 breaths/minute and rectal temperature varied from 40.66 to 41.80°C, respectively, these observed values were significantly ($P < 0.05$) different across dietary treatments. This study indicated that CPM supplemented with enzyme did not negate optimal physiological performance of the birds.

Keywords: Cassava peel meal, Starter broiler, Physiology, Enzyme

INTRODUCTION.

Protein intake of Nigerians fell below amount recommended by FAO (Adewumi, *et al.*, 2010). Food Agricultural Organization recommended 70g /capital/head/day and that of animal origin to be 35g /capital /day but Nigerians consumed 9.3g /day as against the 35g /capital/day Adewumi *et al.* (2010) reported such protein intake that is animal origin to be 6.0g -8.44g /head/day of fish and animal species but lower than 63.8g protein intake per capital in which only 10 g is animal origin consumed by Nigerians. The low consumption of animal protein origin is as a result of low animal production in Nigeria. Poultry production which depends mainly on these conventional feed ingredients such as maize attributed to high cost which amount to 70% of total production of poultry birds (Ogundipe *et al.*, 2003). Apart from shortage of feed, for optimum production of broiler chicken, physiological responses of birds (heart rate, respiratory rate and rectal temperature) which affect feed intake (Ijadumola, 2020) and general well-being of birds, influenced by environmental condition (Omodewu and Tiamiyu, 2021) and type of feed ingredients that constituted experimental diet. However, to minimize cost and improve profit margin of the farmers' alternative feed ingredient that is cheap and available such as cassava peel is germane.

Cassava peel is a waste from cassava processing centers (Aro, 2010), which is left constituting environmental nuisance (Ajagbe, 2021). Cassava peels are high in soluble carbohydrate but also high in fibre and hydrogen cyanide which reduced feed intake and overall performance of the birds (Odunsi *et al.*, 2001). Hence, Ndelekwtue *et al.* (2020) opined that additives could be added to cassava peel diet to alleviate the problem of high fibre. Exogenous enzyme is one of the additives used to supplement feed to degrade fibre and release more nutrient from fibrous feed (Onimisi *et al.*, 2016). Therefore, the objective of the study is to investigate the effect of enzyme supplementation on cassava peel meal in replacement of maize on physiological responses of starter broiler chickens.

MATERIALS AND METHODS

The study was conducted at the Poultry Unit of Catholic Church Estate, Otu-Egunbe, Kabba, Kogi State. Kabba is located in guinea savannah belt of Nigeria between latitude 7°50'N of the equator and longitude 6°04'E of the Greenwich Meridian (KCA, 2010). Day old chicks were purchased from reputable farm in Ibadan, enzyme was sourced from Kaduna other feed ingredients were purchased from open market in Kabba. Cassava peel was obtained from Kabba and its environs. The cassava peel was grated and de-water over night with the aid of locally made hydraulic screw press machine. The grated cassava peel was pulverized and sieved manually using 2.5mm diameter sieve and was sundried for 3 days and included in the diets.

Experimental design

One hundred and eighty (180) day old chicks were distributed randomly into five treatments with three replicates per treatments in a Completely Randomized Design (CRD)

Experimental diets

Five (5) replacing maize at 0, 6, 12, 18 and 24% dietary maize and coded T₁ (0% CPM -enzyme) represent the control diet, T₂ (6% CPM+enzyme), T₃ (12% CPM+enzyme), T₄+enzyme, T₅+enzyme (Table1). Multigrain multienzyme was used at a rate of 0.01%/100kg feed.

Table1: Composition of experimental diets for starter broilers fed diets containing graded levels of CPM supplemented with enzyme

	Level of inclusion of CPM (%)				
Ingredients	T ₁ (0)	T ₂ (6)	T ₃ (12)	T ₄ (18)	T ₅ (24)
Maize	50.70	46.70	40.70	34.70	28.70
SBM	38.25	39.25	36.90	37.00	34.65
CPM	0.00	6.00	12.00	18.00	24.00
Maize offal	7.00	3.00	1.50	0.00	0.00
Blood meal	0.00	0.00	2.55	2.30	3.20
Bone meal	3.15	3.15	3.15	3.15	3.15
Salt	0.25	0.25	0.25	0.25	0.25
Lysine	0.15	0.15	0.15	0.15	0.15
Methionine	0.25	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Palm oil	0.00	1.00	2.30	3.95	5.40
Enzyme	0.00	0.01	0.01	0.01	0.01
Total	100.00	100.00	100.00	100.00	100.00
Calculated nutrients					
Crude protein	23.08	23.05	23.06	23.05	22.48
Crude fibre	4.06	4.45	4.65	5.00	5.26
ME (Kcal/Kg)	2831.55	2800.31	2796.60	2801.88	2803.7

Effect of CPM with enzyme on physiological response of starter broiler chickens

The effect of CPM supplemented with enzyme on physiological indices of starter chicks is shown in Table 2. The heart rate, respiratory rates and rectal temperature increased significantly ($P<0.05$) as percent substitution of maize for CPM supplementation increased in the diets, however, the observed values did not follow a definite order. Observed values of heart rate (HR) indicated that birds fed on diet containing 24%CPM supplemented with enzyme (T₅) had significantly ($P<0.05$) lower (HR)than birds on control diets(T₁) and those birds on other test diets. Observed values of HR ranged from 274.00 to 320.33beats/minute. Obtained values of respiratory rate (RT) showed that birds fed on diet containing 24%CPM supplemented with enzyme(T₅) had least RT. Birds on diet containing 6% CPM supplemented with enzyme (T₂) had similar RT with those birds on the control diet (T₁). RT values ranged from 55.67 to 94.33breaths/minute. All physiological parameters (heart rate, respiratory rate and rectal temperature) evaluated were significantly different ($P<0.05$) across the treatment groups.

Table 2: Physiological indices of Starter broiler chickens fed Cassava peel meal supplemented with enzyme

	Levels of Inclusion					
Parameters	T1 (0%)	T2(6%)	T3(12%)	T4(18%)	T5(24%)	SEM
Respiratory Rate (breath/minute)	46.33 ^c	39.00 ^d	52.33 ^b	58.33 ^a	42.67 ^d	3.87
Haert Rate (beats/minute)	365.16 ^a	366.35 ^a	183.18 ^d	253.16 ^c	302.16 ^b	3.87
Rectal temperature(°)	40.48 ^d	40.63 ^b	40.33 ^c	40,58 ^c	47.40 ^a	0.01

Observed values of heart rate, respiratory rate and rectal temperature for birds fed CPM based diets supplemented with enzyme had higher values of these parameters compared to those birds on control diets. This may be attributed to an increase in metabolic activities in the system of the birds on CPM diets supplemented with enzymes during the process of digestion due to the level of fibre This concurred with the report of Omodewu and Tiarniyu (2021) who asserted that Arbor acre has high physiological responses. Rectal temperature increased as maize substitution by CPM supplemented with enzyme increased in the diets but the trend is erratic. The observed value fell within the normal rectal temperature of broiler birds reported by Donkon (2001) that reported rectal temperature that

ranged from 41°C to 42°C. Observed values of the current study were lower. Observed elevated heart rate, respiratory rate and rectal temperature may be attributed to population of male in each treatment and environmental factors as opined by Omodewu and Tihamiyu (2021).

CONCLUSION

Based on the result obtained, inclusion of CPM supplemented with enzyme did not aggravate the thermal responses of the experimental birds. Hence, birds performed better even at 24% inclusion level.

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