Preliminary study on the evaluation of the nutritional potential of mixtures of hatchery by-products and cassava peel meal in cross-bred growing rabbits diet

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ABSTRACT: This study was designed to evaluate the synergistic effects of combining hatchery waste / cassava peel meal (HWCPM) on the performance and relative organ weights of growing rabbits in an 9-week feeding trial. Twenty eight crossbred growing rabbits of between 451.8 and 459.6 g initial body weight were used for the study. The hatchery wastes consisting of candled out egg and dead in embryo which were cooked for one hour at 100°C and sun dried before mixing with sun dried cassava peels in ratio 3:2 (w/w). Four experimental diets were formulated. Diet 1 (control) was a maize-groundnut cake diet formulated to meet the nutrient requirements of growing rabbits; mixture of HW/CPM was included at 5, 10, and 15% for diets 2, 3 and 4 respectively. The rabbits were randomly divided into four groups of seven rabbit each. Each rabbit serves as a replicate in a complete randomized design experiment. Rabbits fed control diet had lower final weight (1207.5 g) if compared with those fed 5% (1452.2 g) , 10% (1596.2 g) and 15% (1350.2 g) inclusion levels of HWCPM. Feed intake increased linearly with increasing levels of HWCPM. The relative organ weights showed that the liver, heart, kidney and spleen were not affected (P>0.05) by dietary treatments. It was concluded that HWCPM can be added to growing rabbits' diets without any adverse effect on the performance of rabbits.

Kew words: Cassava peels, Hatchery waste, Performance, Organ weights.

INTRODUCTION – Rabbit production especially in developing counties could be a veritable means of alleviating the prevailing problem of low animal protein consumption due to its obvious advantages over other livestock. However feeding rabbit especially on concentrate in order to obtain optimum growth and good reproductive performance is a major problem because of the high demand for cereal and legume grains by man for consumption and industrial uses. Historically, the use of grains to feed animals has primarily been a practice of developed countries (FAO, 2012). According to the report, 40% of cereals are used for livestock feed in the United States, while only 14% are used for feed in Africa. The feed industry in most developing countries is faced with a number of challenges not only in regards to availability of ingredients but also the ability to produce high quality products in a cost effective manner (Chauynarong *et al*., 2009). Sourcing for alternative ingredients to conventional ingredients therefore become imperative. Candled out eggs, hatchery by-products (egg shall and dead in embryo) has high protein content and can be processed into useful energy and protein feed stuff. The major limitation in the use of cassava for feeding livestock is its low protein content. Consequent upon this and the high cyanide content

cassava peels usage in animal feeding requires protein supplementation of such diet and processing to reduce the cyanide content. (Okpako *et al*., 2008). This study investigated the nutritional potential of processed hatchery by-product/ cassava peel meal mixtures in the diet of growing rabbit.

MATERIAL AND METHODS – The experiment was carried out at the rabbit unit of the Teaching and Research farm, Ladoke Akintola University of Technology, Ogbomoso, which is located within the derived Savannah Zone of Nigeria. The agro-ecological description of the study area had earlier been done by Oguntoyinbo (1978). Hatchery-by-product was collected from a reputable hatchery while the cassava peels were collected from the cassava processing unit of the Faculty of Agricultural Sciences in the University. The hatchery waste was cooked for an hour at 100ºC after which it was sun dried and milled. Fresh cassava peels were rinsed with water, drained and spread to sun dry before milling. The hatchery waste and cassava peel were combined in ratio 3:2 and used to formulate four diets (Table 1). A total of 28-cross bred (Newzealand white X Chinchilla) growing rabbits with mean weight of 451-459g were used for the experiment. They were randomly distributed into four treatment groups consisting of 7 rabbits per treatment with each rabbit serving as a replicate in a complete randomized experiment. They were fed between 7:00-8:00 hrs and 15:00-16:00 hrs daily. Data on weight gain, feed intake were used to calculate the feed:gain ratio. At the end of the feeding trial, four animal per treatment were randomly selected, starved for 12hrs weighed and slaughtered. The organs (liver, heart, kidney, spleen and lungs) were neatly dissected weighed and the values expressed as a percentage of body weight. The test ingredients as well as the experimental diets were analyzed for proximate composition as described by (AOAC, 2005). All data collected were subjected to one way analysis of variance using the General linear Model of SAS (2000). Means were separated using Duncan Multiple Range test (SAS,1989).

Table 1 – Experimental diets, test ingredients and the proximate analysis

Ingredients (%)	**Diet 1**	**Diet 2**	**Diet 3**	**Diet 4**
HWCPM	-	5	10	15
Groundnut cake	10	6	45	2
Brewers dry grain	24	22.5	21	19.5
Palm kernel cake	15	15.5	14	12.5
Maize	34	24	24	24
*Fixed ingredients	27.00	27.00	27.00	27.00
Crude protein (%)	16.67	16.90	16.76	17.26
Metabolizable Energy (kcal/kg)	2504.66	2535.38	2556.31	2577.21

* Fixed ingredients (%): corn bran 8.25, rice bran 14, fish meal 1, bone meal 2.5, salt 0.5, premix 0.25, lysine 0.05 and methionine 0.25.

RESULTS AND CONCLUSIONS – The metabolizable energy as well as the crude protein values of the experimental diets showed that they were adequate for growing rabbits (Lebas *et al*., 1986). The performance of the rabbits (Table 2) showed that dietary inclusion of hatchery/cassava peel meal mixture had significant ($P<0.05$) effect on the mean final weight. The values obtained for rabbits fed HCWPM based diets were higher ($P<0.05$) than the value (1207.50g) recorded for the control. Average daily

weight gain followed a similar trend. The results agree with the report of Agunbiade *et al*. (2011).

Table 2 – Performance characteristics of weaned rabbits fed HWCPM

Parameters	**Diet 1**	**Diet 2**	**Diet 3**	**Diet 4**
Initial weight (g)	457.6±83.7	457.1±72.6	459.6±64.4	451.8±95.9
Final weight (g)	1207.5±104.7^{c}	1452.2±57.4^{b}	1596.3±7.2^{a}	1350.2±107.2^{b}
Daily weight gain (g)	11.90±2.37^{c}	15.80±1.91^{b}	18.04±1.03^{a}	14.26±1.53^{b}
Daily feed intake (g)	47.4±7.8^{c}	57.1±0.7^{b}	63.2±3.9^{a}	63.9±1.1^{a}
Feed:gain ratio	4.98±1.23^{a}	3.95±0.51^{c}	3.75±0.33^{c}	4.25±0.38^{b}
Organs (% body weight)				
- liver	3.60±0.01	3.60±0.16	3.85±0.29	3.86±0.39
- heart	0.25±0.03	0.23±0.03	0.20±0.00	0.23±0.25
- kidney	0.70±0.10	0.60±0.40	0.45±0.03	0.63±0.10
- spleen	0.05±0.01	0.35±0.01	0.35±0.00	0.06±0.00
- lungs	0.55±0.06^{ab}	0.60±0.10^{ab}	0.35±0.03^{b}	0.70±0.14^{a}

Diet 1 = 0% HWCPM, diet 2 = 5% HWCPM, diet 3 =10% HWCPM, diet 4 = 15% HWCPM
^{abc} means within a row followed by different superscript letters differ significantly ($P \leq 0.05$).

The daily feed intake (DFI) increased as inclusion level increased. The least DFI value (47.4g/day) recorded in the control diet may be an indication that it was less accepted by the animals compared to HWCPM based diets. The feed to gain ratio favours animals placed on 5 and 10% HWCPM based diets. The relative organ weights except lungs showed no significant ($p>0.05$) difference. The differences observed in the relative lungs weight could not be attributed to the use of the test ingredient because the difference did not follow a particular trend.
In conclusion, HWCPM can be included in weaning rabbit diet up to 15%, but 10% gave the best performance.

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