

## Effect of Replacing Maize with Threshed Rice Head Supplemented with and without Enzyme on the Growth Performance of Weaner Rabbits

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### ABSTRACT

A feeding trial was conducted to investigate the effect of replacing maize with threshed rice head (TRH) supplemented with and without enzyme on the growth performance of weaner rabbits. Fifty four rabbits were randomly allotted to six dietary treatments of three replicates. There were three rabbits per replicate in a  $2 \times 3$  factorial arrangement in a completely randomized design. There were three replacement levels (0, 7.5 and 15%) supplemented with and without enzyme in the diets. The response on TRH replacement showed that all the parameters measured (daily feed intake, final weight, daily weight gain and feed conversion ratio) were significantly ( $P < 0.05$ ) affected by the test diets except initial weight and mortality. The results of enzyme supplementation also had significant ( $P < 0.05$ ) effect on daily feed intake, final weight, daily weight gain and feed conversion ratio. The study concluded that TRH can be included in the diet of rabbit up to 15% with enzyme supplementation as the animals performed very well even at 15% TRH replacement level.

**Keywords:** Rabbits, Performance, Supplementation, Threshed rice head, Maize, Enzyme

### INTRODUCTION

In Nigeria, as in most developing countries, the daily intake of animal protein (4.5 g/person/day) falls grossly below the recommended 35 g animal protein per person per day [1]. This low consumption rate may be attributed to the declining rate of animal protein availability in the country. Due to the resultant increase in the demand for animal protein as a result of the rapid growth of human population in developing countries like Nigeria, Rabbit as a micro-livestock has become an economic animal that can bridge the wide gap between dietary protein production and consumption. Unlike other monogastrics (poultry, pig, etc.), rabbits have peculiar digestive physiology which permits the use of forages and agro-industrial by-products thus making them non-competitive specie with man for cereal and legume grains. Since reducing production cost and still maximize profit in a way that will not affect the optimum performance of the animal negatively are the main objectives of farmers, sourcing for alternatives to the inadequate and expensive energy and protein basal feed stuffs like maize, groundnut cake, fish meal and soybean has become imperative. Different rice parts during and after harvesting have been shown through various researches to contain various nutrients that favors their use as animal feed. A proximate analysis of threshed rice head revealed relatively good values of crude protein (8.06%), crude fibre (13.15%), ash (4.18%), ether extract (2.68%), nitrogen free extract

(66.41%) and metabolizable energy (2259.70 kcal/kg) at 92.48% dry matter content.

### MATERIALS AND METHODS

#### Experimental animals, design and management

The fifty four five weeks old weaner rabbits used for this study were randomly selected and allotted to six experimental diets in a  $2 \times 3$  factorial arrangement in a completely randomized design. Each treatment had three replicates and each replicate had three rabbits, comprising of nine animals per treatment. The rabbits were housed in a cage with wire meshed hutches. The cage was raised above the ground in a well-ventilated pen. Feed and water were supplied *ad-libitum* (without restriction).

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### Sources and processing of threshed rice head (TRH)

The threshed rice head was collected from rice farms in Gwagwalada, Abuja. After drying, the threshed rice head were crushed in a feed mill and sample was taken for proximate analysis before inclusion into diets.

### Experimental diets

Six experimental diets were formulated with the threshed rice head (TRH) with and without enzyme supplementation at different levels of replacement. Diets 1, 3 and 5 contained 0, 7.5 and 15% TRH without enzyme while diets 2, 4 and 6 contained 0, 7.5 and 15% TRH with enzyme supplementation. Maxi grain enzyme was used for this study.

### Data collection

Initial body weights of the animals were recorded and final weights were also recorded at the end of the experiment. The performances of the animals were closely monitored. Parameters measured and calculated included: daily and weekly feed intake, weekly weight gain, feed conversion ratio and mortality. Daily feed intake was measured by weighing and subtracting theorts (left over) and gathered wastages from the total weighed feed served per day. The daily intake was multiplied by seven to get the weekly intake for each treatment replicate. Weekly weight gain was measured by weighing each animal on a table size weighing scale at the end of every week and subtracting the weight from the previous week animal weight. Feed conversion ratio was measured by dividing feed intake by weight gain.

### Data analysis

Data collected were subjected to statistical analysis using general linear model according to SAS [2]. Significant differences were separated using Duncan's multiple range tests [3].

## RESULTS AND DISCUSSION

The performance result of rabbits fed diets containing graded levels of threshed rice head (TRH) with and without enzyme supplementation as partial replacement for maize is presented in **Table 1**. Both TRH replacement and enzyme supplementation results showed significant differences ( $P < 0.05$ ) in daily feed intake, final weight, daily weight gain and feed conversion ratio of the rabbits fed the different dietary treatments but initial weights of the animals across all dietary treatments were not significantly different ( $P > 0.05$ ) from one another. The highest daily feed intake of 45.7 g observed in rabbits that consumed diet with 15% TRH replacement signifies that increased fibre content in the feed stimulated more feed consumption. This is in agreement with Nakkiset [4] who reported that, increasing the crude fibre level in rabbit diet results to increased voluntary feed

intake. The increase in weight gain of rabbits that consumed diets with 7.5 and 15% threshed rice head replacement levels might be due to the fact that these set of animals consumed more feed than rabbits that consumed the control diet. Agunbiade et al. [5] reported similar results in weight gain increase when cassava peels and leaves were included in the diets of growing rabbits and also attributed the increased weight gain to increased feed consumption. The lower feed conversion ratio with increase in the level of threshed rice head in the diet of the animals indicate better performance in terms of converting feed to flesh. Nuhu [6] agrees with this result as he reported better feed conversion ratio after including sun-dried rice straw in place of maize in rabbit diet.

Even though Adeniji [7] reported no significant differences ( $P > 0.05$ ) in the daily feed intake of rabbits when rice husk with and without probiotics and enzyme supplementation was used to replace groundnut cake in the diets of grower rabbits, the increased feed consumption as a result of enzyme supplementation in this study might be due to the influence of the enzyme on the feed as enzyme addition increases the surface area of the feed thereby aiding in the ability of the animals to consume more feed and also enhance the efficiency of feed utilization. Rabbits that consumed the enzyme supplemented diets also had higher weight gain. The weight gain increase can be because more of the feed consumed by these set of animals were converted to flesh due to better feed utilization. Enzyme has been reported to improve weight gain in monogastrics [8]. This agrees with the findings of Adebisi and Abdulhamid [9] who also reported daily weight gain increase when they supplemented Dried Bovine Rumen Digesta with enzyme in rabbit diets. The increase in weight gain due to the addition of exogenous enzymes in the feed of monogastric animals was further explained by the report of Aro et al. [10]. According to these authors, exogenous enzyme could increase the activity of endogenous enzymes and interrelating hormones which regulate the endocrine system of the animal body thereby promoting nutrient availability and performance. Enzyme supplementation also significantly affected the efficiency of feed utilization as feed conversion ratio showed improved nutrient utilization ( $P < 0.05$ ) in enzyme supplemented diets. This finding agrees with the report of Oladunjoye et al. [11] who claimed that enzyme supplementation has positive effect on feed conversion efficiency. There was quite an observable level of interaction between feed effect and enzyme effect on the performance of the experimental animals. The interaction between enzyme supplementation and levels of threshed rice head replacement on weight gain and feed conversion ratio in this study suggest that they both played important roles in the better performance of the experimental rabbits.

**Table 1.** Performance of weaner rabbits fed diets containing graded levels of threshed rice head with and without enzyme supplementation as partial replacement for maize.

	Initial wt. (g)	Daily feed intake (g)	Final wt. (g)	Daily wt. gain (g)	FCR	Mortality
<b>TRH Levels</b>						
0%	636.1 <sup>a</sup>	39.4 <sup>b</sup>	1045.2 <sup>c</sup>	7.3 <sup>c</sup>	5.3 <sup>a</sup>	0.1 <sup>a</sup>
7.5%	641.6 <sup>a</sup>	44.1 <sup>a</sup>	1132.7 <sup>b</sup>	8.7 <sup>b</sup>	5.0 <sup>a</sup>	0.0 <sup>a</sup>
15%	638.8 <sup>a</sup>	45.7 <sup>a</sup>	1243.6 <sup>a</sup>	10.8 <sup>a</sup>	4.2 <sup>b</sup>	0.5 <sup>a</sup>
SEM	5.0	2.3	10.2	0.4	0.7	0.2
LOS	NS	*	*	*	*	NS
<b>Enzyme level</b>						
No enzyme	648.1 <sup>a</sup>	41.1 <sup>b</sup>	1117.1 <sup>b</sup>	8.3 <sup>b</sup>	4.9 <sup>a</sup>	0.2 <sup>a</sup>
Enzyme	629.6 <sup>a</sup>	45.0 <sup>a</sup>	1164.0 <sup>a</sup>	9.5 <sup>a</sup>	4.7 <sup>b</sup>	0.2 <sup>a</sup>
SEM	23.6	3.2	1.0	0.3	0.1	0.2
LOS	NS	*	*	*	*	NS
Interactions	*	*	*	*	*	NS

*a, b, c*: means with different superscripts within the same column differ significantly ( $P < 0.05$ )

TRH: Threshed Rice Head; SEM: Standard Error of Means; LOS: Level of Significance; NS: Not Significant; \*: Significant; FCR: Feed Conversion Ratio

**CONCLUSION**

Judging by the better performances of rabbits that consumed the diet with 15% TRH replacement for maize, it can be concluded that weaner rabbits can efficiently utilize TRH up to 15% in their diets especially when supplemented with enzyme and still realize optimum performance. Effort should be intensified using multi-enzymes to investigate if higher inclusion level of threshed ice head in rabbit diets can also yield good result.

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