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# THE IMPACT OF WHITE MANGROVE LEAVES *(LANGUCULARIA RACEMOSA)* AS FEED ADDITIVE ON PERFORMANCE CHARACTERISTICS OF ADULT RABBITS

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**ABSTRACT**
A research work was carried out to determine the additive effect of (*Langucularia racemosa*) white mangrove leaves on performance characteristics of adult rabbits. A total of forty eight (48) rabbits of equal ratio of bucks and does were used in a completely randomized designed of four treatment groups A, B, C, and D of 12 rabbits per treatment. Each treatment was replicated thrice with four rabbits of (2 bucks and 2 does) per replicate. Results showed that significant differences ($P<0.05$) existed in the performance characteristic It was therefore concluded that (*Langucularia racemosa)* white mangrove leaves can be used as an additive in rabbits production at the inclusion level of 90g/kg of feed without causing any health challenge in the rabbits.

**KEY WORDS:** Langucularia racemosa, performance characteristics and rabbits.

## INTRODUCTION

Fulfilling the nutritional requirements of a particular class of livestock is rapidly becoming a difficult charge. This is due to scarcity and high cost of feed and feed ingredients. However, the prohibitive cost of some feed ingredients and commercially prepared feed mixtures is one of the most serious problems confronting livestock farmers. Hence, previous researchers Casartelli *et al*., 2005; Sarabmeet *et al*., 2006; Samli *et al*., 2006) research in animal feeding has been geared towards finding potential substitutes for high cost feed ingredients and proper feed formulation techniques as a means of reducing cost and keeping production to the optimum level. Cheap and viable interventions are needed to eliminate this low protein consumption. Rabbit production comes handy is this regard, since it has as short generation interval, is cheap, easy to manage and widely, accepted across class, ethnic and religious differences. Feed additives are non-nutrients of biological, mineral and medicinal sources along with other chemical agents used in feeds to bring about possible increase in production (Wekhe, 2000). The compelling need to harness the potentials of the numerous non-conventional feed additives to replace or promote efficient utilization of the expensive conventional ones may likely be achieved with feed additives such as *Langucularia racemosa.* The test feed additive *Langucularia racemosa* may likely play the role of alternative antibiotic growth promoters that are indigeneous and medicinal plants known to possess a wide range of antibacterial and antifungal properties. They could be employed in dietary manipulation to promote growth in place of synthetic antibiotics due to resistance of synthetic antibiotics by certain bacteria pathongens and for economic reasons. Extensive research is currently on-going to discover some plants-additives and other alternative to antibiotics as growth promoters in animal production (Bolukbasi *et al.,* 2006, Duruna *et al*., 2009; Oko and Agieny, 2009).

## MATERIALS AND METHODS

**Location of the Experiment:** The study was conducted at the Teaching and Research Farm of the Rivers State University of Science and Technology located in the Niger Delta region which lies within the longitude of $4^0$ 35'' and $4^0$ 5'' N and latitude $7^0$ 00'' and $7^0$ 53'' E. Niger Delta region has 2,405.2mm as its average annual rainfall and $29.7^0$ C as its annual mean air temperature. It has $31.3^0$C as highest mean monthly mean temperature (in August) and the lowest monthly mean temperature at $27.5^0$ C (in January).

**Experimental Sample Material:** The sample of whole *Langucularia racemosa* leaves were harvested fresh from their natural habitat at the Eagle Island, Port Harcourt, and Rivers State, Nigeria. They were thoroughly washed and rinsed in distilled water and were oven dried at $70^0$c for two hours in accordance with the methods of Wekhe *et al*. (2009), milled to powder, and weighed out according to their treatment levels with the aid of top load balance (Ohans Scout II).

**Experimental Animals and Management**

Forty-eight (48) adult New Zealand White rabbits comprised of equal ratio of bucks and does were procured from Small Animal holding unit of the Department of Animal Science, Federal University of Technology, Owerri, Imo State for this experiment. The rabbits were subjected to two weeks of acclimatization prior to the beginning of the experiment. During this period of acclimatization, the animals were subjected to the same

pre-experimental management conditions. They were administered with prophylactic coccidiostat (25% embazim) as well as broad spectrum antibiotics (terramycin soluble powder). Vitamin drugs (biovite) were also administered to the rabbits. All drug requirements were administered through drinking water.

**Experimental procedure**

Concentrate feed was formulated and used as basal diet for the experiment, Table 1.The rabbits were randomly allocated to the four designated treatment groups (A, B, C and D) with twelve animals per treatment and each treatment was replicated three times, with four rabbits per replicate of equal sexes (two bucks and two does). The rabbits in treatment group A were used as control, while those in treatments B, C, and D were fed with the graded levels of the feed additive *Langucularia racemosa* at the rate 50, 70 and 90 gram in treatment B, C and D respectively in completely randomized designed for 84 days.

**TABLE 1:** Composition of rabbit diets

| Ingredient | A (Control) | B (50) | C (70) | D (90) |
|---|---|---|---|---|
| Yellow Maize | 31.00 | 31.00 | 31.00 | 31.00 |
| Palm Kernel cake | 15.00 | 15.00 | 15.00 | 15.00 |
| Groundnut cake | 15.25 | 14.75 | 14.55 | 14.35 |
| Wheat Bran | 35.00 | 35.00 | 35.00 | 35.00 |
| Bone meal | 3.00 | 3.00 | 3.00 | 3.00 |
| *Vit./ Min Premix | 0.25 | 0.25 | 0.25 | 0.25 |
| Dl methionine | 0.10 | 0.10 | 0.10 | 0.10 |
| Salt | 0.40 | 0.40 | 0.40 | 0.40 |
| L. racemosa | - | 0.50 | 0.70 | 0.90 |

*Vitamin A 8000000 I.U, vitamin $D_3$ 1600000 I.U, vitamin E 5000 I.U, vitamin K 2000 mgr, Thiamine 1500 mgr ,Riboflavin $B_2$ 4000 mgr, Pyridoxine $B_6$ 1500 mgr, Niacin 15000 mgr vitamin $B_{12}$ 10 mgr, Pantothenic Acid 5000 mgr, Folic Acid 500 mgr, Biotin 20 mgr, Choline chloride 200 gr, Antioxidant 125 gr, Manganese 80 gr, Zinc 50 gr, Iron 20 gr, Copper 5 gr, Iodine 1.2 gr, Selenium, 200 mgr Cobalt 200 mgr.

Feed intake was determined by weighing the quantity of feed fed to the rabbits and the leftover on a daily basis using Avery scale. The difference between the initial quantity and the left-over after 24 hours presents, the quantity consumed by the animals. Feed efficiency was also calculated in relation to the body weight and feed consumed. At the commencement of the experiment, the initial weight of all the animals was measured and recorded. Body weight gain was subsequently measured at seven days interval in each replicate. The data collected were subjected to statistical analysis of variance (ANOVA) according to Steel and Torie (1980) and differences existed, means were compared using Duncan multiple Range Test (DMRT) according to statistical system procedure of SAS (1999).

**RESULTS AND DISCUSSION**

Significant differences ($P<0.05$) were observed in weight gain among the groups, Table 2. The mean weight gain in kg for the rabbits were (0.49, 0.57, 0.67, 0.73 ± 0.15) for treatment A, B, C and D respectively. The highest weight gain was observed in the treatment group D administered 90g of the test additive, followed by group C Treatment group A recorded the least weight gain. Significant differences ($P<0.05$) were observed in daily feed intake (Table 2). The mean total feed consumed in kg by the control group of animals was 6.01 and 6.11, 6.00, 5.64 for B, C, D respectively. The values obtained did not differ significantly ($P>0.05$) between the control groups of rabbits and the other treatments groups of the animals. There were significant differences ($P<0.05$) observed in the values of the feed conversion ratio between the control group of rabbits and the test group of rabbits.

**TABLES 2:** The influence of Langucularia *racemosa* on the feed intake off rabbits (means ± SEM)

| Parameters | A(0g) | B (50g) | C (70g) | D (90g) | SEM |
|---|---|---|---|---|---|
| Mean initial weight (kg) | $1.05^b$ | $1.07^b$ | $0.85^a$ | $0.80^a$ | 0.45 |
| Mean final weight (kg) | $1.62^a$ | $1.56^b$ | $1.52^b$ | $1.53^b$ | 0.30 |
| Mean weight gain (kg) | $0.49^d$ | $0.57^c$ | $0.67^b$ | $0.73^a$ | 0.15 |
| Mean total feed consumed (kg) | 6.01 | 6.11 | 6.00 | 5.64 | 0.20 |
| Feed coversion Ratio (feed/gain) | $12.27^a$ | $10.72^b$ | $8.96^c$ | $7.73^c$ | 0.18 |
| Cost of feed/ Kg rabbit (₦) | 47.46 | 47.11 | 46.97 | 46.83 | 0.21 |
| Total cost of feed consumed (₦) | 285.24 | 287.82 | 281.82 | 2.64.12 | 0.28 |
| Cost of feed/ Kg weight gain (₦) | 582.12 | 504.95 | 420.63 | 361.81 | 0.19 |
| Cost differential / Kg gain (₦) | - | 77.17 | 161.49 | 220.31 | 0.28 |
| Relative cost benefit /Kg gain (%) | 100 | 115.29 | 138.39 | 264.23 | 0.31 |

abc within rows, mean with different superscript differs SEM: Standard Error Mean

Control group of rabbits recorded 12.27 and the values decreased with increase in concentration of the feed additive *Langucularia racemosa,* and recorded as follows 10.72, 8.96 and 7.73 for groups B,C and D respectively. Treatment D had a superior feed conversion ratio seconded by treatment C, while treatment B value was higher than the control group of animals, Table 2. The result on the average weight gain showed that, rabbits in

treatment D fed (90g) of the test additive performed best. This result may likely be due to reduction in microbial load in the rabbits, this finding corroborates with the work of Bandaranayake (1998a), who reported that mangrove plant have antimicrobial properties. The observed values in weight gain exhibited by the experimental rabbits in this work indicated that, the feet additive *Langucularia racemosa* used in this study may have assisted in efficient utilization of the consumed feed to gain more weights.

This work is further supported by the work of Ogbamba and Wekhe (2005), who showed that mansonia altissima caused weight gain and improved feed conversion in laying hens and cocks. This finding give audience to Maynard et al., (1970) that some additives such as antibiotics, hormones or arsenics, enzymes and live yeast culture are useful in promoting livestock growth. The non significant effect in feed intake obtained in this study could probably be attributed to the; processing method of the fed additive, physical condition of the additive or the feeding pattern as reported by Gabriel *et al.* (2006). A similar report was made by Ogbamgba and Wekhe, (2005). Feeding *Mansonia altissima* to laying birds and cocks, they opined that *Mansonia altissima* could be used to increase weight gain and egg production, with decrease in feed intake. Feed conversion ratio showed significant differences between control and the treated groups. The conversion ratio improved with increasing dosage of the feed additive, indicating that *Langcularia racemosa* has capacity to improving efficiency of feed utilization. This could explain why there were no significant differences in average feed intake. The lower the feed to gain ratio the better the diet hence translating to reduction in cost of production.This obtained result corroborates earlier report (Wekhe, 2000) of weight increase in broilers fed *Mansonia*. *Aaltissima*. He opined that *M. Atissima* brought about an increased feed conversion by the birds. Therefore inclusion of *langucularia racemosa* as feed additive up to 90g level administered in this study will bring about an economic improvement in the utilization of feed required to raise or maintain rabbits indirectly by fast weight gain. The attendant advantage is when the added *langucularia racemosa* is economically insignificant, while both feed saved and the weights added were economically significant.

Engberg *et al.,* (2000) reported that nutritional additives do not have a part to play in animal nutrition, what they do is to make the process more effective in some way, either by counteracting some growth depressants in the system by modifying normal balances or by improving the appeal and quality of the feed offer and thereby feed conversion efficiency. The result on feed conversion in this study suggest that the additive modified and improved the appeal and the quality of the commercial feed used in this study thereby enhancing efficient utilization of the consumed feeds to gain more weight. In corroboration with this finding, Ortserga *et al*. (2008) obtained similar results using garlic powder in the diets of growing rabbits and reported improved weight gain, decrease feed intake and improved feed conversion ratio. Furthermore Ademola *et al*. (2007) fed mixture of 1.5% garlic and 2% ginger to broilers chicks and reported significant reduction in microbial load, which accounted for the growth promotion of the four weeks old broiler chicks. The observation in this study on growth performance indices signifies that the test additive *Langucularia racemosa* has capacity of improving efficiency of feed utilization at the highest inclusion rate of 90gram/kg of feeds.

Also, there was gain in monetary margin in the production cost with the inclusion of *Langucularia racemosa* in the rabbit diets. The reduction in the cost of feed/kg weight gain with incremental levels of *L. racemosa* feed additive in the diets (from ₦582.12 to ₦361.81) and in the cost differential per gain and the relative cost benefit per kg gain of the rabbit. The decrease in cost of feed per kg weight gain from the control group to treatment D, has great cost differential per kg gain (₦77.17 – ₦220.31) and also high relative cost relative cost benefit per kg gain (100-264%), from treatment A to D. This reduction in the cost of feed will be of great benefit to the farmer, since feed alone account for more than 60% of the recurrent expenditure in livestock production. Therefore, the cost of producing a kg weight decreased from ₦582.12 for the control to ₦361.81 for treatment B – D. This suggests a favorable cost analysis which could be interpreted to mean a positive response of rabbit to *L. racemosa* in the diet. The cost-benefit also showed a gain per kg weight produced as the *L. racemosa* was added to the diet of the rabbit.

Therefore, livestock farmers and feed millers are advised to use this additive (*Langucularia racemosa*) to promote performance characteristics and health of rabbits. The highest level of inclusion (90g/kg feed) is recommended for this purpose.

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