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## Research Article

# Reproductive Hormonal Assay of Rabbit Does Fed Rhizophora Mangle PITH

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**ABSTRACT**

Herbal medicines has gradually acquired vital therapeutic role of replacing synthetic medications for animals and humans due to increased incidence of drug resistance hence this study was carried out to investigate hormonal assay of Haloquine rabbit breeds placed on rhizophora mangle pith. Thirty six adult rabbit breeds (24 does and 12 bucks) of 2.2kg average weight where randomly assigned to four rhizopith based dietary treatments (T1= 0%, T2 = 5%, T3= 10%, and T4= 15%,) respectively for 12 weeks. The 84-day ad-libitum feed trial was tested in a 4x3 Completely Randomized Design (CRD). Results on hormonal assay were all significant (P>0.05), however, T4 (15%) rhizopith inclusion rate was different from other treatment and highest on HPL, Prolactin and LH (P>0.05) but it is the same with T1 (0%) Rhizopith inclusion on DHEAS. On the other hand, testosterone and FSH was highest for T3 and different from others (P>0.05) on reproductive efficiency result indicate kit weight, number born alive, number born dead, gestation length, receptivity, conception ratio, vulva colour, mating duration, copulation rate and weight of in does were all significant (P>0.05). From the result it can be concluded that Rabbit does can be fed with rhizopith to as high as 15% of total diet since they are highly fibre tolerant without any adverse effect on the reproductive hormone production. In conclusion, therefore, rhizopith at 15% be adopted as part of rabbit diet because it is safe, cheap and available.

**Key words:** Rhizophora mangle, Rhizopith, Rabbit Does, Hormones

## INTRODUCTION

There has been expression of great concerns by several authors in various publications for the past two decades on the low level of animal protein intake by Nigerians (Ajala and Balogun 2004; FAO, 2002). Rabbit production in Nigeria has continued to fall short of the ever increasing demand of the rapidly growing population of over 140 million and from the projected demand and supply of meat for the future, a great short fall glaringly stares us in the face. Therefore, there is need to encourage the use of non-competitive feed materials such as rhizopith to increase rabbit production.

Rabbits are important source of food, and produce white meat that is high in protein, low in fat, highly palatable, low in cholesterol and can substitute poultry in most recipes. High quality rabbit skin are used in fur garment (clothing, hats), to cover bicycle seats, etc. and their use could spark a village industry (crafts projects). Rabbit is used for cosmetic, medical and pharmaceutical research laboratories (Harkness, 2010).

The use of phytochemical extracts to improve the reproductive function and overall performance of animals (rabbits and man) had long been report (Yakubu *et al*., 2003; Ratnasorija and Dharmasiri, 2000). *Laguncularia racemos*a (white mangrove) abundance and its seemingly forgotten potentials as nutritional and economic plants prompted the trial of the pith of *Rhizophora mangle* to investigate its influence on the hormonal assay of rabbits since monkeys in the wild have been seen to eat the pith of red mangrove.

## MATERIALS AND METHODS

The experiment was conducted at the Rabbitry section of the Teaching and Research Farm of Ignatius Ajuru University of Education Ndele Campus, Rivers State, Nigeria.

Thirty-six (36) Haloquine rabbit breeds comprising 12 bucks and 24 does were randomly allotted to a 4x3 experimental treatment using a Completely Randomized Design (CRD). Each treatment had 3 replicates and each

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**Table 1:** Gross composition of the experimental diet

| Ingredient | $T_1$ % | $T_2$ % | $T_3$ % | $T_4$ % |
|---|---|---|---|---|
| G.N.C | 10.0 | 10.0 | 10.0 | 10.0 |
| Maize | 13.0 | 13.0 | 13.0 | 13.0 |
| PKC | 27.40 | 27.40 | 27.40 | 27.40 |
| S.B.M | 3.0 | 3.0 | 3.0 | 3.0 |
| WB | 40.0 | 40.0 | 40.0 | 40.0 |
| Guinea corn | 3.0 | 3.0 | 3.0 | 3.0 |
| Bone meal | 2.0 | 2.0 | 2.0 | 2.0 |
| Lysine | 0.5 | 0.5 | 0.5 | 0.5 |
| Methionine | 0.5 | 0.5 | 0.5 | 0.5 |
| Salt | 0.3 | 0.3 | 0.3 | 0.3 |
| Premix | 0.3 | 0.3 | 0.3 | 0.3 |
| Rhizopith | 0 | 5 | 10 | 15 |
| Total | 100% | 100% | 100% | 100% |

**Table 2:** Proximate analysis of the experimental diet

| Proximate component | Percentage composition |
|---|---|
| Ash | 4.43 |
| Moisture | 8.13 |
| Fat | 0.24 |
| Protein | 4.49 |
| Carbohydrate | 24.7 |
| Fibre | 57.99 |
| Energy(*kcal*/100g) | 111.94 |

Replicate has 3 animals (2 bucks and 1 doe). The experiment lasted for 84 days. Rhizopith inclusion rate was $T_1$ (0%), $T_2$ (5%), $T_3$ (10%) and $T_4$ (15%), respectively.

Young roots of *Rhizophora mangle* (Red mangrove) was harvested from the intertidal zone of Krakra-ma waters in Asari-Toru L.G.A. in Rivers State. The roots were immediately broken open to remove the pith and the pith were sun dried to remove moisture and then grounded (Rhizopith) to about 2mm size to enable easy picking by the rabbits when milled with other feed ingredients of the experimental diet.

Samples of some dried ground Rhizopith as well as formulated diets were taken to the University of Port Harcourt laboratory for proximate analysis. Rabbits were fed the treatment diets as shown in table 1 throughout the duration of the experiment. $T_1$ (0%) rhizopith inclusion served as control. The gross composition and proximate composition of the experimental diet is presented in Table 1 and 2 respectively. Weighed feeds were served *ad-libitum* to the rabbits every morning with fresh drinking water and remnants removed and weighed the following morning. This process was conducted throughout the experimental period. Feed consumed per replicate was recorded daily by deducting the left over feed from the previous amount.

Data was collected for feed intake and weight gains during the experiment. At the end of each week, rabbit does in each replicate was weighed individually using appropriate weighing scale. Weight gained was determined by deducting present weight from the initial weight whereas daily feed consumption was determined by deducting the feed left over from original amount.

Blood sample from does were collected from the marginal ear vein of the experimental rabbits a day before mating and two weeks post-mating between the hours of 7:00 and 8am before feeding. The samples were collected in a set of sterile plastic bottles and allowed to coagulate to produce sera for hormonal analysis. The test for hormonal parameters in the blood serum (testosterone, luteinizing hormone (LH), follicle stimulating hormone (FSH), progesterone, estradiol, oxytocin and vasopressin were carried out with the aid of the tube-based enzyme immune assay (EIA) method. The protocol used for the hormonal assay was according to the method described for the kit [Bio check ELISA Assay, USA]. The hormonal assay was carried out before and after mating respectively.

Data collected at the end of the experiment was summarized and analysed statistically using the analysis of variance (ANOVA) and the mean separation was carried out where appropriate using the Duncan's new multiple Range Test (DMRT) as described by Steel and Torrie (1999).

## RESULTS AND DISCUSSION

Results of hormonal assay of rabbit does fed rhizopith a day before mating and two weeks post-mating are presented on Table 3. The scientific hormonal display of any biological entity if properly analyzed can to a high degree of certainty forecast conception rate. The Human placenta lactogen (HPL) also called human chorionic somatotropin (HCS) which is a polypeptide placental hormone was significant ($P<0.05$). It modifies the metabolic state of the mother during pregnancy to facilitate the energy supply of the fetus. Probably that may be the reason for T4 with 15% rhizopith level was different from all other treatments ($P<0.05$). HPL also has anti-insulin properties, this also may certify why birth weight in T4 was also the highest though not statistically significant ($p>0.05$). Insulin would not be allowed to deplete glucose so that fetus energy supply may not deplete. HPL is a hormone secreted by the syncytiotrophoblast during pregnancy. Like human growth hormone, HPL is encoded by genes on chromosome 17q 22-24. It was identified by Josimovich in 1963.

Dehydroepiandrostoren (DHEAS) was also significant ($p>0.05$). T4 and T1 (control) treatment were on same level and different from T2 and T3. According to Center for Human Reproduction, DHEA (or dehydroepiandrosterone) is a naturally existing hormone that the female body converts into androgens, mainly testosterone. Though androgens are male hormones, they're present in both sexes and are essential in the female body for the production and development of healthy eggs. One is therefore poised to probe why T1 (0% rhizopith), and T4 (15% rhizopith) respectively were the same statistically.

Testosterone on the other hand was also significant ($p<0.05$) with T2 (10% rhizopith) recording the highest value, whereas T1 and T4 were still on same level. Experts have long been aware of the role of testosterone for men, but few understand how testosterone fits into women's health and fertility. There have been many questions on the role of testosterone in women. It is however, important to note according to natural fertility that while women produce much less testosterone than men, testosterone is a necessary hormone for a woman's sexuality, libido and energy. Testosterone is an androgen (male) hormone. In women, testosterone production is split between the ovaries and adrenals. The level of testosterone is highest in women during puberty.

**Table 3:** Effect of Rhyzopith inclusion rate on sex hormones of rabbit

| Parameters | Normal Range | Treatments | | | |
|---|---|---|---|---|---|
| | | T1 (control) 0% Rhizo | T2 5% Rhizo | T3 10% Rhizo | T4 15% Rhizo |
| HPL(mcg/g) | 5-7 | 0.0600 ± 0.01 | 0.0233 ± 0.01$^{c}$ | 0.0300 ± 0.005$^{c}$ | 0.0633 ± 0.007$^{a}$ |
| DHEAS (ug/dl) | 145-395 | 343.00 ± 1.00$^{a}$ | 328.00 ± 1.00$^{b}$ | 285.67 ± 2.67$^{c}$ | 344.00 ± 2.00$^{a}$ |
| Testosterone ((ng/d) | 3- 5 | 533.00 ± 2.00$^{b}$ | 530.00 ± 2.00$^{c}$ | 542.00 ± 1.50$^{a}$ | 548.00 ± 2.00$^{b}$ |
| Prolactin (ng/ml) | 10-20 | 17.26 ± 0.06$^{b}$ | 15.22 ± 0.12$^{d}$ | 15.51 ± 0.04$^{c}$ | 17.36 ± 0.08$^{a}$ |
| FSH (mu/ul) | 3 | 5.64 ± 0.01$^{b}$ | 5.55 ± 0.17$^{c}$ | 6.6 ± 0.06$^{a}$ | 5.47 ± 0.15$^{d}$ |
| LH (ng/mg) | 2-4.5 | 8.42 ± 0.02$^{d}$ | 8.67 ± 0.15$^{c}$ | 9.22 ± 0.10$^{b}$ | 9.63 ± 0.35$^{a}$ |

a, b, c, d means within same row with different superscripts are significantly different (P<0.05). **Key:** HPL: Human placenta lactogen, DHEAS: Dehydroepiandrosterone, FSH: Follicle Stimulating Hormone, LH: Luteinizing Hormone; Normal range of reproductive hormone; i. Luteinizing hormone (LH) 2 – 4.5ng /ml; ii. Follice stimulating; hormone (FSH) 3pg/ml; iii. Prolaction 10 – 20 ng/ml; iv. Testoslerone 3- 5 pg/ml; v. HPL – 5- 7 mg/ml; vi. DHEAS - 145 - 395 mg; **Source:** https://www.sciencedirect.com.

Prolactin, FSH and LH are influenced by sexual receptivity (Rodriguez *et al*., 1989). This may probably adduce why receptivity that was significant and highest for T3 and T4, also had the highest prolactin and LH for T4, and FSH for T3. T4 having the highest birth weight may also be linked to peak prolactin production in treatments 3 and 4 which had 10% and 15% rhizopith inclusion rates respectively.

## Conclusions

From the result of the study it can be concluded that rabbit does can be fed with rhizopithto as high as 15% of total diet since they are high fibre tolerant without any adverse effect on the reproductive hormones production. In conclusion therefore, rhizopith be adopted as part of rabbit diet because it is safe, cheap and available.

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