

The Effect of *Rhizophora racemosa* (Red Mangrove) Leaves and Root-Bark on Testosterone and Oestrogen Levels in Blood Serum of Broilers

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Abstract

An experiment was conducted in the Teaching and Research Farm of the RSUST, Port Harcourt to evaluate the effect of *Rhizophora racemosa* (Red Mangrove) on testosterone and oestrogen levels in blood serum. Using a 2x3 factorial arrangement in a completely randomized design experiment. The birds were randomly allocated into seven treatment groups, A, B₁, B₂, B₃, C₁, C₂, and C₃ of 15 birds per group. All groups were replicated thrice with five birds. Pulverized *R. racemosa* leaf and root-bark was administered to the birds at levels of 70, 80 and 90 grams for both leaf and root-bark. The highest levels of inclusions (90gm) were used. The experiment lasted eleven weeks. Results obtained showed that *R. racemosa* significantly ($P < 0.05$) increases testosterone and Oestrogen level in broilers.

Keywords: Blood; Broiler; Oestrogen; *Rhizophora racemosa*; Testosterone

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Introduction

The Nigeria population has been reported to have relatively fast growth rate [1]. This means that the current poor intake of animal protein by Nigerians would worsen in the future if urgent steps are not taken to address the situation. It has been suggested by a number of investigators that poultry and its products hold the key to bridging the protein deficiency gap. This is, however, possible only when improved reproduction and management methods are employed to enhance replacement and even more production. Productionists now source for non-conventional and cheaper sources of additive as a substitute to reduce high cost of conventional additives and drugs for livestock. One of the plants of interest is *Rhizophora racemosa* (Red Mangrove), which is easy to process and is abundantly available throughout the year. *R. Racemosa* have been investigated by several researchers including Wekhe and Oboh [2] and Wekhe and Ebiye [3] and found not to have any adverse effect on the general well-being of the bird. In this study, the effect of *R. racemosa* leaf and root-bark on testosterone and oestrogen levels of blood serum will be investigated using the highest dose of 90g/kg for both leaf and root-bark respectively [4-8].

Material and Methods

One Hundred and Five (105) Ross day old broiler chicks (DOC) were used. The study was completely randomized, using the 2x3 factorial design. Two treatment combinations; viz: the *R. racemosa* leaf and root-bark were used, and three different graded levels were administered (70, 80 and 90g/kg of feed) for both leaf and root-bark, while the control was 0.00g/kg. The arrangement is therefore: Treatment B₁, B₂ and B₃ which had 70, 80 and 90g of leaf in 1kg feed and treatments C₁, C₂ and C₃ also had 70, 80 and 90g of the root-bark in 1kg feed. Treatment A is the control, so had no additive in the feed. The *R. racemosa* specimens of leaves and roots were obtained from the brackish water of the Eagle Island Port Harcourt. They were flushed clean with tap water allowed air dry of water, they were then separately (i.e. leaf and root) dried in the oven at a temperature of 70/80 °C for 48hrs to a water content level of 10%. The dried specimens were then ground into powdery forms [9-12]. These powders were measured in graded doses and fed to the birds as already, described. The birds were

brooded and allowed to acclimatize and stabilize for two weeks. The experiment proper started in their third week of age and lasted for nine weeks. The birds were eleven weeks old at the end of the experiment, when they were slaughtered. Twelve hours prior to slaughter, feed was withheld from the birds to reduce gut content but were allowed free access to clean drinking water. The birds were killed by decapitation using a sharp. Rapid and complete bleeding was ensured by holding the legs of the birds upwards and the head downward. Blood samples were collected into labeled tubes with no anticoagulant [13-16]. Samples of blood were collected from treatment A i.e. control from male (♂) and female (♀) birds, treatment B₃ (90g leaf) and treatment C₃ (90g root-bark) and to test for the effect of *R. racemosa* leaf and root-bark on testosterone and oestrogen levels of the experimental birds. The blood samples were immediately taken to the Haematology department of University of Port Harcourt for analysis. Result obtained from the blood analysis were computed statistically using ANOVA and Duncan's Multiple Range test for Separation of means.

Result and Discussion

Testosterone is the male sex hormone produced from the testes. The male secondary sex characteristics depend on the presence of adequate amounts of testosterone in the body (Frandsen, 1979). Testosterone promotes the development and function of accessory

sex glands, causes development of secondary sex characteristics, and controls secretion of LH (luteinizing hormone) in the male. It also promotes protein anabolism, resulting in increased body size as compared to the female. The skeleton also responds to testosterone, with the bones becoming larger and thicker [17]. The results for treatments B₃ and C₃ are comparatively similar in the levels of testosterone, and significantly ($p < 0.05$) higher than the control (Table 1). This is expected since the testes and ovaries of the treated birds were observed to be bigger than the control. It was also observed that the males were massive and fall, and they started to crow at eight weeks old. This indeed is an expression of masculinity and maturity in birds. Thus pulverized *R. racemosa* leaf and root-bark increase testosterone level in broilers. Oestrogen refers to the female sex hormone that stimulates female sex glands. An increasing level of oestrogen is undoubtedly an important factor in development of libido-the sex drive associated with receptivity to the male by the female. Secondary sex characteristics associated with femininity to a large extent result from the actions of oestrogen [18]. The result of the experiment showed that oestrogen levels in the treated birds were significantly ($p < 0.05$) higher than the control. The female broilers were observed to be attractive and sharp with bright eyes and reddish comb. It was also observed that the weights of their ovaries were higher than the control. These are characteristics of maturity influenced by *R. racemosa*.

Table 1: Effect of *R. racemosa* on testosterone and oestrogen levels (nm O/L) of broilers.

	Treatment A (Control) A (0.00g)	Treatment B (Leaf) B ₃ (90g)	Treatment C (Root-Bark) C ₃ (90g)
Testosterone	2.32 ^b	2.88 ^a	2.71 ^{ab}
Oestrogen	0.31	0.37 ^a	0.36 ^a

^{ab}means with different superscripts vary significant ($p > 0.05$).

Conclusion

The results of the effect of *R. racemosa* leaf and root-bark on testosterone and oestrogen levels of broilers showed that there is a significant difference when compared with that of the control. This means that *R. racemosa* influences sex hormones in broilers. And because of the significant rise in the level of testosterone and oestrogen, *R. racemosa* can be used to improve libido breeder broilers.

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