

The Effect of *Rhizophora racemosa* (Red Mangrove) Leaf and Root-Bark on Some Organs (Testis, Ovary and Bursa of Fabricus) Weight of Broilers

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Abstract

An experiment was conducted with one Hundred and five (105) day old Ross broilers chicks to determine the effect of *Rhizophora racemosa* leaf and root-bark on organs (testis, ovary and bursa of Fabricus) weight on broilers. Using a 2x3 factorial arrangement, a completely randomized design was conducted. 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 were administered to the birds at graded levels of 70, 80 and 90 g/kg of feed for both leaf and root-bark. The experiment lasted eleven weeks. Results obtained showed that *R. racemosa* significantly ($P > 0.05$) increase the size of testis, ovary and bursa of Fabricus, in broilers. It was concluded that *R. racemosa* is a potent feed additive that can be used to develop the bird's immunity as well as to improve the reproductive potency of parent broilers because of the increase in size of both testis and ovary which concomitantly means increase in testosterone, ovary and sexual activity.

Keywords: Broiler; Bursa of fabricus; *Rhizophora racemosa*; Ovaries; Testis

Introduction

The shrinkage in the availability of animal protein for human food is really a critical component of global problem on food production especially in developing countries and Nigeria in particular. The Nigerian population has been reported to have a relatively fast growth rate [1]. Because of this low animal protein intake, many researchers have however suggested ways of curbing this problem [2-4]. Productionists now source for non-conventional aid cheaper feed and medication sources as a substitute to reduce high cost of conventional feed and drug sources for livestock. Some indigenous plants livestock have been suggested by Daiziel [5], which produced good performance results but required some relatively difficult processing and many not be in sufficient quantity. However, *Rhizophora racemosa* (Red Mangrove) plant does not require such difficult processing and are in abundant particularly in the costal areas and creeks of the Niger Delta of Nigeria. The use of plants as additives in poultry feed has been highlighted by several researchers including Wekhe & Taylor [6], Wekhe & Igoni [7], Wekhe & Njoku [8] amongst other. These authors found out that plants and plant products can be use not only as antibiotics but also as growth promoters in livestock. *Rhizophora racemosa* is the red species of the mangrove plants. It is the vast and abundant red mangrove plant among the common trees of the saltwater swamp. Some studies had been done on this plant using lower dosages [9,10]. This Study was designed using higher doses of *R. racemosa* (70, 80 and 90g/kg of feed) leaf and root-bark to determine the effect on organs weight (testis, ovaries and bursa of fabricus).

Material and Methods

One Hundred and five (105) Ross day old broiler chicks (DOC) were randomly allocated to seven treatment groups; A, B₁, B₂, B₃, C₁, C₂, and C₃. The groups were further replicated into three sections of five birds each. The birds had an average initial weight of 50g at day old. The *R. racemosa* specimen of leaves and roots were obtained from the brackish water

of the Eagle bland 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. These powders were measured in graded doses and fed to the birds as already, described. The birds were allowed to acclimatize and stabilize for two weeks before experiment commenced. Pulverized graded *R. racemosa* leaf and root-bark was mixed with 1kg of feed. Treatment A=control, B₁=70g leaf, B₂=80g leaf, B₃=90g leaf; C₁=70g root-bark, C₂=80g root-bark and C₃=90g root-bark. At the end of each week, the birds in each replicate were weighed collectively using "HAVA the big boss" weighing scale. The experiment taste nine weeks, and the birds were eleven weeks old when they were slaughtered. Birds were randomly slaughtered in all the treatments and the organs were located and carefully excised. Organ of interest were the testes, ovaries and bur of Fabricus. The organs were kept in ready bottles containing formalin. The organs were weighed using the Topload sensitive balance (OHAUS SCOUT II) at the food sciences technology laboratory of Rivers State University of Science and Technology, Port Harcourt.

Result and Discussion

The result showed in general a wide linear difference between control and treatments and that the consumption of *R. racemosa* leaf and root-bark increases these organs (Testes, ovaries and bursa of Fabricus) significantly ($p < 0.05$) in broilers (Table 1). Values for the weights of the testes in treatment C₁ (70g Root-bark) were the highest. Similarly, the weights of the ovaries in B₃ and C₃ were significantly ($p < 0.05$) higher than the control aid the other treatments. Also, there were significant ($P < 0.05$) differences in the weights of the bursa of fabricus between treated birds and control. Treatments B₁ and B₃ (leaf) recorded the highest values,

results indicated that values obtained from treatment A (control) are relatively low. The mean values of organ weights for the various treatment varied significantly. Generally, treatment C₁ (70g root-bark) had significantly higher mean values for both testes and ovaries. Higher dosage of 80g and 90g for both treatments was observed to reduce the sizes and weights of these organs, maybe due to over dosage. Perhaps also, this maybe due to inhibitory activities of saponin (anti-nutritional factor) contained in the root-bark, or maybe explained in the context of overloading of the carrier system [11]. Lower doses of *R. racemosa* root-bark (70g) seem to do better because the bursa of fabricus could handle lower doses better. The weight of the organs varies substantially among the birds. This variation may influence the potential of the testis or ovary to produce sperms or eggs. Spermatogenesis relies on testosterone, which can also be measured in the blood as an indicator of fertility [12,13]. However, a measurement of the weight of the organ would also be valuable. There are literatures to suggest that birds with large ornaments are expressing higher reproductive fitness [14-16]. In female the correlation between ovary weight as an indicator of fertility in birds in feasible, the results obtained supports the hypothesis [17,18]. The relative weight of the organ of a broiler, may, therefore, provide a valuable clue to the reproductive ability of the broiler.

Conclusion

The results of the effect of *R. racemosa* leaf and root-bark on testes and ovaries showed that there is a significant differences in the weight of these organs against the control. This means that *R. racemosa* (root-bark especially) improves the reproductive parameters in broilers and can be used for such. Also, the bursa of Fabricus was observed to be better developed in the treated birds, *R. racemosa* can thus be used to fortify the resistance of broilers against diseases and stress.

Table 1: Effect of *R. racemosa* leaf and root-bark on some organs weight (g).

Organs	Control	Treatment B leaf			Treatment C Root-bark		
	A	B ₁ (70g)	B ₂ (80g)	B ₃ (90g)	C ₁ (70g)	C ₂ (80g)	C ₃ (90g)
Testis	1.02 ^b	1.12	3.12	6.95 ^{ab}	15.25 ^a	1.57	3.55
Ovaries	0.96 ^b	1.17 ^{ab}	1.35	1.42 ^a	1.43	1.24 ^{ab}	1.42 ^a
Bursa of fabricus	1.02 ^b	3.48 ^a	2.42 ^b	2.97 ^{ab}	2.33	2.06	3.12 ^a

^{ab}means along the same row with different superscript vary significantly ($p > 0.05$).

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