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EFFECT OF *Jatropha tanjorensis* LEAF EXTRACT ON SEMEN QUALITIES AND BLOOD PROFILE OF COCHIN BIRDS

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Abstract
The study was conducted using *Jatropha tanjorensis* leaf extract to assess the effect on semen qualities, haematology and serum biochemical indices of Cochin birds reared in University of Nigeria Nsukka. A total of 72 sixteen weeks Cochin birds comprising 12 cocks and 60 hens were used for this experiment. The birds were randomly divided into 4 treatments (T1 to T4) of 18 birds each serving as 0ml, 5ml, 10ml and 15ml leave extract, respectively. Semen and blood were collected from different treatments after eight weeks and analyzed. The result on semen qualities shows significant differences ($P < 0.05$) in all the parameters except semen pH that was not significant ($P > 0.05$). The percentage of the active cell, Normal cell and sperm concentration were highest in T1 (66.67%, 76.67% and 72.67% respectively). There was also significant ($P < 0.05$) differences in haematological blood platelets in which T3 and T4 were the best (326.67 and 320.00). The result on serum biochemical indices revealed that T4 was the best in Aspartate aminotransferase (AST), Alanine aminotransferase (ALT) and Alkaline phosphate (ALP) with 15.33, 13.67 and 28.33, respectively. It could be concluded from this study that while the addition of *Jatropha tanjorensis* leaf extract at this level hampers the semen qualities of Cochin birds, it enhances some of their blood profile parameters. Therefore, 0ml extract is recommended for optimum expression of cochin semen.

Kew words: Cochin birds, *Jatropha tanjorensis*, semen qualities, blood profiles

DESCRIPTION OF PROBLEM

The Nigeria continued expansion in urbanization, from 34.8 percent in 2000 to 49.5 percent by 2017, has implications on food security especially protein intake (1a). The immediate resultant effect is that many Nigerians have adopted the habit of replacing pricey animal proteins with plant-based proteins, or eat a wider range of inexpensive, high-calorie cereals, as well as starchy roots and tubers, than proteins (1b). This is to enable them better manage the income available in order to accommodate other pressing family needs. The Cochin breed, apart from its esthetics is prized for its higher egg, meat quality and faster development rates (1c) Growing emphasis on sustainable poultry production drives the search for natural alternatives to synthetic additives like antibiotics and growth promoters. Most of these phytochemicals are components of essential oils, which include carvacrol, capsaicin, cineole, cinnamaldehyde, eugenol, flavonoids, isoflavones, polyphenols, resveratrol, thymol, and many others that are well known for their potent antioxidant and antimicrobial properties (1). Jatropha tanjorensis (Farm – Euphorbiaceous), has been consumed as leafy vegetable and as medicinal plant in Nigeria. Through hematological screening, it has been shown to be antimalarial, antimicrobial, normalize hypoglycemic activities and this can be attributed to several classes of phytochemical compounds such as the polyphenols, saponins, tannins and alkaloids which are relevant to poultry physiology and production (2).Over the years, sperm quality has been a critical determinant of male fertility and plays a significant role in reproductive success especially in poultry management and improvement (3). While some phytogenic have shown positive effects on these parameters in poultry, research on *J. tanjorensis* particularly concerning semen quality and blood profile needs to be exploited to reveal more approaches to improving poultry production for increased Nigerians' protein intake.

MATERIALS AND METHOD

The study area

The Experiment was carried out at the poultry unit of Animal science farm, department of Animal Science, University of Nigeria Nsukka, Enugu State.

Experimental animal and management

A total of 72 sixteen weeks Cochin birds (12 cocks and 60 hens) were used for this experiment. The birds were randomly assigned into four treatments with 18 birds per treatment with three replicates of 6 birds per replicate in a ratio of 1 cock to 5 hens using artificial insemination method. Dry wood shaving was used on the floor as the bedding material. The birds were fed mashed feed *ad libitum* for all the treatments with varying quantities of J. *tanjorensis* leaf extracts on a daily basis for 8 weeks.

Collection and preparation of experimental material

J. tanjorensis leaves were freshly harvested, washed, weighed and mashed using water and soaked for 6 hours after which it was sieved and boiled for 10mins, allowed to cool and stored in the fridge for use.

Data collection and laboratory analysis

The cocks were trained for semen collection in fourth and fifth week, and the semen for analysis were collected at sixth week. The two-man method of semen collection in cocks (1d) as described by Burrows and Quinn was used to collected semen for laboratory analysis. At the end of the eight weeks experiment, 2.5 ml of blood was collected from each of two birds from each replicate for laboratory analysis.

Experimental design and statistical analysis

The statistical package used was Statistical Product for Service Solutions (SPSS) while the experimental model that was used is a completely randomized design (CRD) as shown below:

$Xij = U + Ti + Eij$

Where: Xij = any measurement taken, U= population mean, Ti= effect of the J. *tanjorensis*, Eij= Experimental error.

Data analysis

The results from the laboratory were subjected to analysis of variance (ANOVA) to determine the significance of the data and any significant effect amongst the means were separated using the Duncan's New Multiple Range Test (4).

RESULT AND DISCUSSION

Table 1 shows the semen qualities of cocks placed at different treatments. There were significant ($P < 0.05$) differences in all the parameters tested except the semen pH. T1 is the best in active cell, normal cell and semen concentration (66.67, 76.67 and 72.67) respectively. T4 is the highest in percentages of abnormal, sluggish and dead cells (66.67, 18.33, 28.33) respectively. This shows that addition *Jatropher* leaf extract in the diet of poultry feed at this level does not affect the semen pH of Cochin cocks. It shows also that progressive increase of the extract in the feed reduces the semen volume. This reduction in semen volume agrees with the findings of (5) indicating that *J. tanjorensis* may have the potential of enhancing spermatogenesis of the cochin birds. This findings of increase of abnormal cell, sluggish and dead cells increase as a result high doses of leaf extract are in line with the findings of Eze et al. [6] that J. *tanjorensis* extract exhibited anti-spermatogenic effects alongside hepato-nephroprotective and hematopoietic properties in male rats.

Table 1: Semen characteristics of Cochin birds fed *Jatropha tanjorensis* leaf extract

	T1	T2	T3	T4	SEM	P V
Semen Vol(ml)	0.47[a]	0.47 [a]	0.37 [a]	0.167 [b]	0.04	0.001*
pH	7.67	7.33	7.67	7.67	0.14	0.82[NS]
% Active	66.67 [a]	46.67 [b]	63.33[a]	46.67 [b]	3.33	0.002*
% Normal	76.67 [a]	46.67 [b]	36.67 [c]	28.33[c]	5.65	0.000*
% Abnormal	18.33 [d]	46.67 [c]	56.67 [b]	66.67 [a]	5.59	0.000*

% Sluggish	9.67[b]	18.33[a]	14.67[a]	18.33[a]	1.19	0.003*
% Dead	19.33[b]	28.33[a]	18.33[b]	28.33[a]	1.57	0.002*
Semen Count(× 10^9)	72.67[a]	65.00[b]	62.67[b]	65.33[b]	1.35	0.016*

Table 2 shows some haematological indices of Cochin birds fed varying levels of *Jatropher* leaf extract. There were no significant (P > 0.05) differences in HB, WBC and RCB meaning that addition of the test extract has no effect on these parameters. This is in variance with (7) who noted that aqueous leaf extract of *J. tanjorensis* had significant effects on hematological parameters in Wister rats. However, there were significant (P < 0.05) differences in blood platelet and TP. T3 and T4 were the best in blood platelet (326.67 and 320.00 respectively) while T1 and T3 performed best in TP (5.13 and 5.27 respectively). This increase in platelet and TP in T3 agrees with (8) who noted that *J. tanjorensis* leaf meal stimulated the formulation of total blood protein, increased the percentage of cells in the blood, enhanced the oxygen-carrying capacity of the blood, and as well as the erythropoietin potentials of the bone marrow of the broiler birds.

Table 2: Haematological indices of Cochin birds fed *Jatropha tanjorensis* leaf extract

	T1	T2	T3	T4	SEM	P V
HB (g/dL)	11.40	11.33	10.33	12.47	0.31	0.90 [NS]
WBC (× 10^{12}/L)	76.67	74.00	82.67	75.33	1.45	0.14[NS]
Platelet (× 10^9/L	303.33[ab]	283.33[b]	326.67[a]	320.00[a]	6.38	0.040 *
RBC (× 10^{12}/L)	273.33	260.00	276.67	253.33	4.99	0.33 [NS]
TP(g/dL)	5.13[a]	4.67[b]	5.27[a]	4.67[b]	0.096	0.014*

Key: (HB=Haemoglobin, WBC=White blood cell, RBC= Red blood cell, TP= Total protein)

Table 3 shows that AST, ALT, and ALP activities were significantly (P < 0.05) altered by treatment. The highest inclusion group (T4) recorded the greatest AST (15.33). However, T2 and T3 were significantly higher than others in ALP and ALP as seen on the table. This shows that increasing dose of jatropha leave extracts in Cochin bird feed increases some serum biochemical indices. These results agree with (9) that administration of high doses of *J. tanjorensis* leaf extract may disrupt protein metabolism function of the liver and can also interfere negatively with the filtration capacity of the kidney resulting in renal and hepatic dysfunction.

Table 3: Serum biochemical indices of Cochin birds fed *Jatropha tanjorensis* leaf extract

	T1	T2	T3	T4	SEM	P VALUE
AST(U/L)	12.67[b]	13.67[b]	13.67[b]	15.33[a]	0.34	0.017*
ALT(U/L)	9.67[b]	9.67[b]	13.67[a]	13.67[a]	1.32	0.000*
ALP(U/L)	20.33[b]	19.33[b]	28.33[a]	28.33[a]	1.35	0.024*

Key: (AST=Aspartate aminotransferase, ALT= Alanine aminotransferase, ALP=Alkaline phosphate)

CONCLUSION AND APPLICATION

It could be concluded from this research that *J. tanjorensis* leaf extract is unsuitable as a reproductive enhancer in Cochin birds as seen at the tested doses levels. Even low doses (5ml) caused sperm abnormalities, while higher doses (≥10ml) added liver risks. Practical application of *J. tanjorensis* leaf extract in poultry should therefore be approached with caution. The findings support further controlled trials to determine the optimal safe inclusion rate, characterize its phytochemical profile, and isolate non-toxic phytochemicals. It could be concluded from this study that while the addition of *Jatropha tanjorensis* leaf extract hampers the semen qualities of Cochin birds, it enhances some of their blood profile parameters

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