Nigerian J. Anim. Sci. 2017 (1):71 - 76

Reproductive Traits of Male Weaner Rabbits Fed Graded Levels of *Garcinia kola* (Bitter kola).

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Target Audience: Rabbit farmers, Researchers.

Abstract

An experiment was conducted to determine the effect of Garcinia kola on the reproductive traits of male rabbits. Twenty four (24) male rabbits of about 1.0+0.46kg were randomly assigned into four (4) treatment groups. Treatment one (T1) had 0% Garcinia kola, while T2 had 2.5% Garcinia kola and Treatment three and four (T3 and T4) had 5% and 7.5% respectively. There were significant difference ($p<0.05$) on all parameters measured. Sperm concentration, sperm count and libido were highest in T4 when compared to other treatments. In fact bitter kola supplemented diets were better ($p< 0.05$) in terms of semen volume sperm concentration, motility and count. The percentage live sperm though differed ($p<0.05$) significantly did not take a definite pattern that can be attributed to toxic effect of chemical component of bitter kola.

Keywords: Bitter kola, male rabbits, sperm, libido.

Description of Problem

Garcinia Kola is a specie of flowery plant in the family Guttiferae or Clusiaceae. It is grown predominantly in the West Africa. It is known to have both nutritional and pharmaceutical properties. The bioflavoboid possesses anti-inflammatory, anti-microbial, anti-viral and anti-diabetic properties (1).

They are also believed to have anti-microbial, antiviral, antioxidant and many other biological activities (2). The bitter kola acts as digestibility enhancers, stimulates secretion of endogenous digestive enzymes (3). This seed has been used traditionally as a purgative, anti-parasitic and anti-microbial element (4). In livestock production, bitter kola has been used, as an additive on performance of broiler chicks (5). It has also been used on West African Dwarf Goats to assess its effect on steroid hormones and electrolytes (6). The alkanoid and bio-flavonial extracts of Garcinia kola seed exhibited the following effects; close dependent spasmolytic effects on uterine and gastro

intestinal smooth muscle, deterioration of reproductive functions (7). However, there is a dearth of information on the effect of bitter kola on the reproductive potentials of male rabbits. This study was therefore designed to check the possible effects bitter kola supplemented diets at various levels on the semen traits and libido of male rabbits.

Materials and Method

The field experiment for this research was carried out at the Rabbitary Unit of Teaching and Research Farm, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria. Awka is located at latitude $6^{o}12^{o}2^{o}$N and longitude $7^{o}4^{o}4^{o}$E. It has an average temperature of about $29^{o} – 34^{o}$C. It's in the humid region, with annual rainfall of about 1828mm.

Twenty four, New Zealand white and Chinchilla cross breeds were used for this experiment. The rabbits were about three (3) months of age weighing about 1 ± 0.49kg. This male rabbits were randomly allotted into four (4) treatment groups.

Each treatment was replicated three (3) times with two (2) rabbits per replicate. The rabbits were fed with 0% bitter kola as Treatment 1 (T_1), 2.5% bitter kola as Treatment 2 (T_2). While Treatment 3 (T_3) and Treatment 4 (T_4) had 5% and 7.5% bitter kola respectively. The experiment lasted for fifty six (56) days. Water and feed were fed *ad libitum*.

The experimental ingredient (bitter kola) was procured from Afor Nnobi market in Idemili south Local Government Area, Anambra state. The samples were oven dried at temperature of 300^{0}c for 48 hours. They were then chopped into pieces before using sonic electric grinder to blend and mix with the feed at different levels.

Data Collection

Semen traits were evaluated by collecting semen with the aid of Artificial Vagina (AV) as was designed and described (8). Does were used as teasers on the days of semen collection. The volume of semen was read off the collection tube attached to the AV and was recorded in millimeters.

Sperm concentration and sperm count were estimated using the Neubauer Haemocytometer. The total number of sperm cell in each ejaculate was counted and the sperm concentration calculated by multiplying the concentration by the ejaculate volume.

Sperm motility, an aliquot of the semen sample was made on a slide using a dropper covered with slip and viewed through a Zeiss Microscope on a warm stage at a magnification of x100. The percentage motility was then estimated for each sample. Percentage live spermcells were determined by using fluorescent stains that penetrated the cells with damaged membrane, and was examined by fluorescent microscopy with propidium iodide and carboxyflurescein diacetate, counting at least 200 cells per sample.

Libido (sex drive) was recorded in seconds with the aid of digital stop watch.

Statistical Analysis

The data collected were subjected to Analysis of Variance (ANOVA) procedures. Where significant treatment effects were detected by mean separation using Duncan's Multiple Range Test (9).

Results and Discussion

The mean values of semen traits of male rabbits fed different levels of Bitter Kola were shown in Table II. There were significant difference ($p<0.05$) on all the parameters measured.

Semen volume differed significantly ($p<0.05$) with T_2 (2.5%) and T_1 (0%), that is, 0.69±0.020 and 0.75±0.036 having the higher volume when compared to T_3 (5%) (0.58±0.025) than T_4 (7.5) (0.47±0.045). The semen volume was in conformation of reports of an average of 0.71ml (10), 0.1 to 1.1ml (11), and 0.5 to 1.5ml, (12). This therefore suggested that the lower volume witnessed in T_3 and T_4 could not be as a result of higher doses of bitter kola since they are still within semen volume range for rabbits.

Sperm concentration was significantly ($p<0.05$) higher in T_4 (237.19±61) followed by T_3 (198.5±2.72) then in T_2 (164.7±2.72) and T_1 (143.7±1.39). This implies that bitter kola improved the concentration of the rabbit semen. The finding was in line with the reports (13) that Gracinia kola has the ability to increase peripheral testosterone. This increase in testosterone and tissue enhancement has been attributed to antioxidant compounds present in the bitter kola (14).

Sperm count differed significantly ($p<0.05$) as the level of bitter kola increases. T1 (104±0.77) T2 (111.3±0.78) T3 (115.7± 0.55) and T4 (117.7 ± 0.66). This finding also proved that bitter kola can increase the sperm cell count in line with the earlier reports that, it increases the spermatogenic activity through its tissue enhancement ability to increase production of spermatids (15) and invariably increase sperm count.

There were significant increases in the sperm motility of the male rabbits assessed. T2 (76.3 ± 0.07) was highest then followed by T3 (73.3± 0.08)and T4 (70.01± 0.07) while T1 (63.67± 1.39) was the least. The significant increase in the sperm motility of the treated weaner rabbits was in support of the findings (16). This higher level could be due to the effect of antioxidants like carotenoid present in Garcinia kola that protects spermatogenesis (17). Though lower levels found in T4 can be attributed toxic component like benzophenone which retards the progressive development of spermatozoa (18).

There were significant difference ($p<0.05$) on the mean values of percentage live sperm measured in the experiment. These differences did not follow a definite pattern that could be attributed to bitter kola effect.

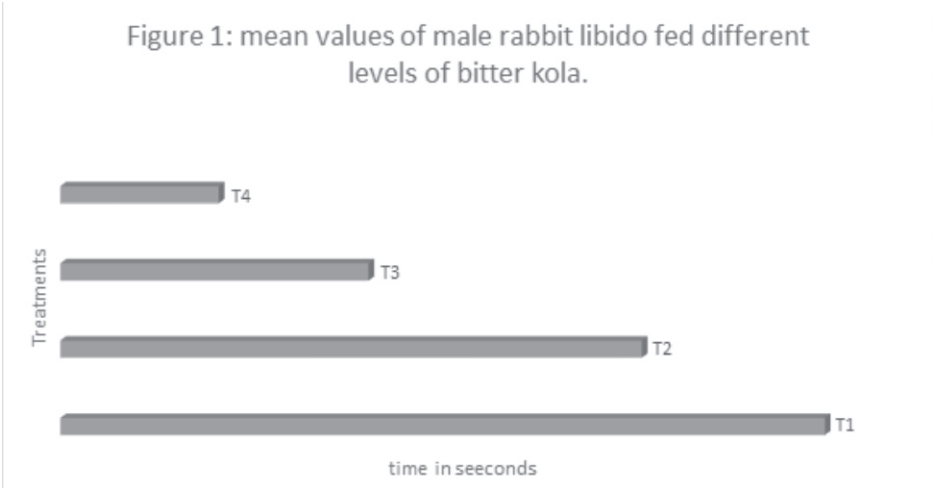
Libido which was measured with reaction time was significantly ($p<0.05$) higher in T1 (28.17±0.11), T2 (21.42± 0.17), T3 (11.35 ± 0.27) and T4 (5.84±0.12). This implies the bitter kola increased the rate of sexual urge as the quantity of bitter kola increased. This confirmed earlier report that bitter kola is has aphrodisiac properties (19).

Table I: Composition of the Experiment Diet

Ingredients	T_1 (0%)	T_2 (2.5%)	T_3 (5%)	T_4 (7.5%)
Maize	40.00	39.00	38.00	38.00
Bitter kola seed meal	0.00	2.50	5.00	7.50
Soyabean Cake	7.00	6.00	5.00	4.00
Fish meal	1.00	1.00	1.00	1.00
Blood meal	1.00	1.00	1.00	1.00
Wheat meal	46.00	46.50	46.00	44.50
Bone Meal	3.00	3.00	3.00	3.00
Salt	0.25	0.25	0.25	0.25
Vitamin Premix	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25
Total	**100**	**100**	**100**	**100**
Calculated Crude Protein	16%			
ME/kcal/kg	2400			

Table 2: Mean Values of Semen Traits of Male Rabbits Fed *Gracinia Kola*

Parameters	Treatment inclusion levels			
	T1 (0%)	**T2 (2.5%)**	**T3 (5%)**	**T4 (7.5%)**
Semen volume (ml)	0.75 ± 0.036^{a}	0.69 ± 0.020^{a}	0.58 ± 0.026^{b}	0.47 ± 0.04^{c}
Sperm concentration ($x10^6$ml)	143.7 ± 1.39^{d}	164.7 ± 2.72^{c}	198.5 ± 2.72^{b}	237.19 ± 3.61^{a}
Sperm count (10^6)	104.4 ± 0.77^{c}	111.3 ± 0.78^{b}	115 ± 0.55^{a}	117.7 ± 0.66^{ab}
Sperm Motility	63.67 ± 1.39^{c}	76.3 ± 0.07^{a}	73.3 ± 0.08^{ab}	70.3 ± 0.07^{b}
% Live Sperm	86.5 ± 0.72^{b}	93.3 ± 0.35^{a}	81.63 ± 0.62^{c}	71.01 ± 0.55^{d}



Conclusion and Applications

1. There were increases in the volume of semen as the level of bitter kola increased.
2. The sex drive of the male rabbits also increased as the level of the bitter kola increased.
3. The study demonstrated the effect of bitter kola on semen traits and libido level of male grower rabbits.
4. Using bitter kola as an additive should be done with caution because of the ant nutritional

factors in it.

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