NSAP 47th Annual Conference (JOS 2022) CONFERENCE PROCEEDINGS
THEME: SECURING ANIMAL AGRICULTURE AMIDST GLOBAL CHALLENGES

EFFECTS OF FERMENTED CINNAMON JUICE EXTRACT ON RED SOKOTO BUCKS TESTICULAR HISTO-MORPHOLOGY

Garba, M.G., Gaddafi, S. and Yakubu, G.
Department of Animal Science Federal University Dutsin-Ma Katsina State
Corresponding author: Email: alghazali8067@gmail.com phone: 08034655789

ABSTRACT
This study was aimed to determine the effect of fermented cinnamon juice extract (FCJE) on red sokoto bucks testicular histo-morphology.A total number of 24 apparently healthy pubertal red Sokoto buck were allotted to four treatments consists of 0, 15, 30 and 45 mls of FCJE in a completely randomized desgn (CRD). The animals were drenched for 8 weeks daily. Two bucks from each treatment were randomly selected and orchidectomized to obtained testes for testicular morphometry and histology determination. The result in this study suggested that bucks supplemented 45 mls FCJE has significantly (P<0.05) higher values of live weight, right testes weight, left testis weight, relative testis weight, right testis volume, left testis volume, and testes volume. Treatment 1 had the highest (P<0.05) testis density values. Non-significant (P>0.05) increases were observed in right testis length, left testis length, right testis width and left testis width. Considerable architectural changes were observed in the seminiferous tubules from cluster, smaller size to larger in size with increases dosage of FCJE. Similarly, wider lumens were observed in control group (T1) and T2 (15 mls FCJE). However, visible interstitial cells and wider interbular space were observed in T3 and T4 where some elongations of seminiferous tubules were prominently observed in both T3 and T4. It was therefore, concluded that supplementation of FCJE has a positive effect in changing testicular morphology and profound responses in altering testicular histological structures. However, further studies are highly suggested to validate this response and fully explore the physiological mechanisms involves for the aphrodisiac activities of fermented cinnamon juice extract observed in this study.

Key Words: Cinnamon, Fermented, Testicular Histo-Morphology

INTRODUCTION
Body and Testicular biometric parameters are very important for establishing reproductive patterns and consequently, the development of protocols for assisted reproduction in different species (Caldeira *et al.*, 2010). Reproductive organs are not unconditionally necessary for the individual life but they have essential role in the reproduction and genesis of species (Abreu and David-Ferreira, 1982). The knowledge of basic morphometric characteristics of the reproductive organs have been found to provide valuable information in the evaluation of breeding and fertility potential of the animals (Ogbuewu *et al.*, 2007). Togun and Egbunike reported that testes size is a good indicator of the present and future sperm production in animals. They further observed that the knowledge of basic morphometric characteristics of reproductive organs is of great value inbreeding soundness evaluation and potential fertility in breeding males. Also, Egbunike *et al.* (1976) reported that morphometric analysis on the testes of any species or breed is necessary in assessing and estimating qualitative changes in testicular component and spermatogenic functions. Similarly, Gage and Freckleton (2003) further described the mammalian testes as infallible predictors of spermatozoa production. On the other hand, the epididymis is an extremely convoluted structure, which is closely attached to the dorsal part of the lateral surface of the testes (Oyeyemi *et al.*, 2000).

MATERIALS AND METHODS
Experimental site
The experiment was conducted at Small Ruminant Animal Unit of Prof. Lawal Abdu Saulawa Livestock Teaching and Research Farm, Department of Animal Science, Federal University Dutsin-Ma, Katsina State, Nigeria.

Experimental and Design

A total of twenty four (24) apparently healthy pubertal Red Sokoto bucks were allotted into four treatment (6 bucks per treatment) comprises four dosage level of fermented cinnomum juice extract consisting three replicate and each replicate consist two bucks in a completely randomized design (CRD). The animals were drenched orally with 0 , 15, 30 and 45 mls FCJE daily for a period of 3 weeks followed by reproductive behaviour trails by individually exposing buck with estrus doe for a period of 30 minutes

Preparation of Fermented Juice Extract

Dry Cinnamom stem were obtained from Katsina central market. The stem was identified, sorted to remove inert materials and grinded using mortar and pestle. The powder material obtainwas further grinded using electric grinding machine to obtained finer particles. One (1 kg) of grinded powder was put in a bowl and 1 Litre of molasses and 5 littres of water was added and mix together thoroughly using paddle. The mixture was poured into a plastic pail and tightly covered to assist anaerobic fermentation thereby preventing some air to get inside the plastic and was allow for fermentation for a period of one week (7 days). Fermented juice was obtained by straining mix through fine cheese cloth. The fermented extract was stored in plastic bottle under normal room temperature.

Testicular Morphology

After experimental period (8 weeks), the buck scrotal circumference was measured prior to ochidectomy of the bucks using open castration technique. Open castration was carried out to measure the actual size and weight of the testes. The bucks were physically restrained, lidocine was infused intradermally, thereafter, 3cm long pre-scrotal incision was made. The underlying fascia was dissected bluntly and the left testis was forced out through the incision by the pressure over the scrotum. The tunica vaginalis was cut through to expose the testis and isolate the spermatic cord. Three artery forceps was used to clamp the spermatic cord at three successive points leaving a small gap between each forceps. The spermatic cord was then ligated at the gaps between the forceps (double ligation) using chromic catgut size 1. Following the ligation the spermatic cord were transected at the outer most forceps (the closest to the testis). A double ligature was then place at the base of the gubernaculums testes after which it was also transected and the testis was removed. The second testes (right) was grasp and pushed towards the incision point, where it was further milked out through the incision. The tunica vaginalis were incised and the same procedure conducted for the left testis was repeated on the right. 1 ml of penicillin-streptomycin was infused into the scrotal sac. The testicles were examined grossly for abnormalities. Testicular weight and length was determined. After morphological data determination the testicular tissues was further preserved and fix in 10% formaline solution and transported histology laboratory from histological preparation of testicular tissue.

Result

Table 1: Testicular Morphometry of Red Sokoto Buck Supplemented Fermented Cinnamon Juice Extract

Parameters	T1	T2	T3	T4	SEM	LOS
Live weight (kg)	13.070^{c}	13.306^{b}	13.950^{b}	15.250^{a}	0.121	*
Right Testis Weight (g)	36.373^{c}	39.497^{bc}	44.447^{b}	56.103^{a}	1.018	*
Left Testis Weight (g)	40.403^{c}	43.970^{c}	49.217^{b}	59.880^{a}	0.781	*
Relative Testes Weight (g)	0.580^{c}	0.623^{bc}	0.670^{b}	0.760^{a}	0.011	*
Right Testis Volume (ml)	17.683^{c}	20.280^{b}	28.733^{b}	39.900^{a}	1.529	*
Left Testis Volume (ml)	14.900^{c}	27.633^{b}	34.033^{b}	44.190^{a}	1.707	*
Testes Volume (ml)	32.583^{d}	47.913^{c}	62.767^{b}	84.090^{a}	1.555	*
Testes Density	2.353^{a}	1.790^{b}	1.490^{b}	1.383^{b}	0.076	*
Right Testis Length (cm)	9.367^{a}	9.500^{a}	9.733^{a}	9.700^{a}	0.059	NS
Left Testis Length (cm)	9.467^{a}	9.500^{a}	9.567^{a}	9.600^{a}	0.036	NS
Right Testis Width (cm)	5.000^{a}	5.100^{a}	5.167^{a}	5.150^{a}	0.036	NS
Left Testis Width (cm)	5.133^{a}	5.100^{a}	5.133^{a}	5.167^{a}	0.024	NS

The result of testicular morphometry of Red Sokoto bucks supplemented fermented cinnamon juice extract was presented in table 1. The result revealed that treatment 4 (45 mls FCJE) had the highest Live weight (kg) followed by treatment T3, T2 and T1 was the lowest. The result also clearly indicate that there are significantly ($P<0.05$) linear increases with increase dosage of FCJE of Right testes weight (g) Left testis weight, relative testes weight, right testis volume (ml), left testis volune, and testes volume. Highest ($P<0.05$) Testes density was observed in control group (0 mls FCJE) followed by T2, T3 and T4 was the lowest. In this study the testicular morphometry variables of right testis length, left testis length, right testis width and left testis width revealed non-significant ($P>0.05$) difference.

From the testicular histology carried out in this study the testicular microphotographs of Red Sokoto bucks supplemented FCJE were presented from plate A to D. Considerable architectural changes were observed in the seminiferous tubules from cluster, smaller size to larger in size with increases dosage of FCJE. Similarly, wider lumen were observed in control group (T1) and T2 (15 mls FCJE). However, visible interstitial cells and wider interbular space were observed in T3 and T4 where some elongations of seminiferous tubules were prominently observed in both T3 and T4.

Testicular Histology

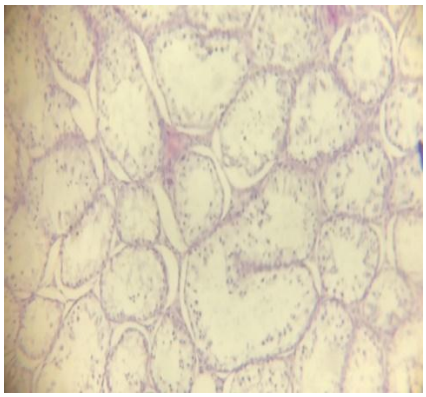

Plate A: Photomicrograph of testicular tissue of Red Sokoto Buck supplemented with 0 mL CFJE. The seminiferous tubules were cluster and majority are smaller in size with wider lumen. (Haematoxylin and Eosine staining x 10 magnification).

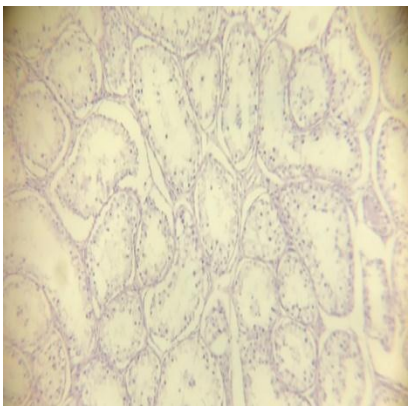

Plate B: Photomicrograph of testicular tissue of Red Sokoto Buck supplemented with 15 mLs CFJE. Smaller size seminiferous tubules with elongations. (Haematoxylin and Eosine staining x 10 magnification).

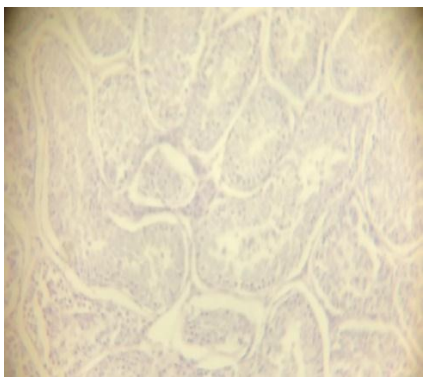

Plate C: Photomicrograph of testicular tissue of Red Sokoto Buck supplemented with 30 mLs CFJE. Visible interstitial cells, seminiferous tubules become larger with minimal lumen, pronounced enlongation of the tubules. (Haematoxylin and Eosine staining x 10 magnification).

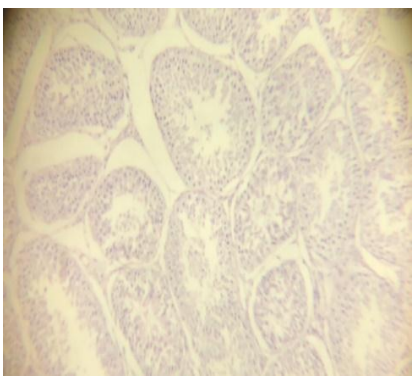

Plate D: Photomicrograph of testicular tissue of Red Sokoto Buck supplemented with 45 mLs CFJE. Wider intertubular space, dense and larger seminiferous tubules ready for division. (Haematoxylin and Eosine staining x 10 magnification).

CONCLUSION

Supplementation of FCJE has a positive effect in changing testicular morphology and profound responses in altering testicular histological structures. However, further studies are highly suggested to validate this response and fully explore the physiological mechanisms involves for the aphrodisiac activities of fermented cinnamon juice extract observed in this study.

Reference

Abreu, I. and David-Ferreira, J.F. (1982). Fine structure of seminiferous tubules from prenally irradiated Rats. *Cell Tissue Research,* 143-152

Caldeira, B.C., RegodePaula, T.A., Matta, S.L.P., Balarini, M.K. and Araujo-Compos, P.K (2010). Morphometry of testis and seminiferous tubules of the Adult crab-Eating Fox (Cerdocyonthous Linnaeus, 1766).*Journal of Animal Biology and Morphology,* 25(5).

Egbunike, G.N., Holtz, W. and Smidt, D. (1976).Reproductive capacity of German Landrance boars. II: Sperm production rates as determined by quantitative testicular histology and from gonadal sperm reserves. *Zuchthygeine,* 11:35-37.

Ogbuewu, I.P., Umesiobi, D.O., Okoro, V.M.O. and Okoli, I.C. (2007).Validation of polysemen admixture on viability and acrosomal morphology of Boar spermatozoa.*Online Journal of Health and Allied Science.* 1:3 http:www.ojhas.org/issue21/2007-1-3-htm.

Togun, V.A. and Egbunike, G.N. (2006).Seasonal variations in the sperm production characteristics of Zebu (White Fulani) cattle genitalia in the humid tropical environment.*Middle-East Journal of Science Research,* 1 (1):87-95