

**EFFECT OF ETHANOIC EXTRACT OF *TRECVLIA AFRICANA* SEEDS ON
TESTOSTERONE, TSH & PROLACTIN IN MALE WISTAR RATS**

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ABSTRACT

A lot of men in the south-eastern part of Nigeria consume bread fruit both for its nutritional benefits as well as other ethnomedicinal purposes. This study is aimed to evaluate the effect of ethanol extract of *Treculia africana* seeds on testosterone, thyroid stimulating hormone & prolactin in male wistar rats. A total of 20 male wistar rats weighing between 160-200g were selected randomly into four groups of five rats each. The animals were given standard finisher mash and tap water twice daily. group 1 (control) received 5ml of distilled water. Groups 2, 3 and 4 (test groups) were administered 250, 300 and 350 mg/kg body weight of ethanoic extract of *Treculia africana* seeds respectively. Administration of extract was done for 10days, and on the 11th day the animals were sacrificed, blood samples were collected for analysis. Findings revealed that there is a significant increase in the mean values of testosterone levels at low, medium, and high dosages when compared with control. Again, there was significant increase in experimental groups that received medium and high dosages of ethanoic extract of *Treculia africana*. Also, the serum levels of prolactin were observed to be increased significantly in medium and high dose and decrease in low dose when compared to the control. The experimental group that received the medium dose of the ethanoic extract of *treculia africana* showed more increase than the low and high doses respectively. The data was analyzed with SPSS version 22, and a p value of ($p \leq 0.05$) was considered significant.

KEYWORDS: Effects, Rats, Organs, Weight.

INTRODUCTION

Medicinal plants play an important role in allopathic medicine, herbal medicine, homoeopathy and aromatherapy by being the sources of a variety of drugs in the modern world (Pradhan *et al*, 2013). The use of plant extract as therapeutic agents is cheaper and easily available to most people in the developing countries. Currently, the highest attention is given to the medicinal values including the antimicrobial properties of plants

from naturally occurring antioxidants of plant origin. Medicinal plants are mostly used as an alternative treatment for some diseases by producing a variety of biologically active compounds of known therapeutic properties (Kumar, *et al*, 2007).

In Nigeria *T. Africana* is commonly called Afou or "bere – foo-foo in Yoruba; Barafuta in Hausa; Ize in Bini; Eyo in Igala; Edikang in Efik; Ukwa in Ibo. (Olapade &

Umeonuorah,2014). In Ogoni it is called yagara (Gbaranor *et al*, 2022b). *Treculia africana* Decne (African breadfruit) is a huge evergreen tree found in tropical and subtropical wet woodlands. It can be found all throughout West and Central Africa. It is a member of the Moraceae family and can reach a height of 30 meters with a 6-meter-wide trunk. The grey stem bark generates a white latex. On the surface, the leaves are huge and dark green, while underneath they are lighter. It's possible that the tree is monoecious or dioecious. (FAO,2020) Male flowers are club-shaped, whereas female inflorescences produce globose heads on a receptacle. When fully mature, it yields large spherical greenish brown fruits that become greenish yellow when fully ripe (World Agroforestry Center, 2005). The fruit is firm and spongy, with numerous oval-shaped seeds scattered throughout the spongy mesocarp [Ejiofor *et al*, 1998]. The creamy white cotyledon is protected by a brown seed coat (inner edible endosperm). While other countries with tropical climates, such as Ghana, the West Indies, Jamaica, and Sierra Leone, are already growing breadfruit and jackfruit (*Artocarpus* species), *Treculia africana* has gotten little academic attention. This fruit's edible part is the seeds. One tree can produce 200 kg of dried seeds under ideal environmental circumstances. Its yield, however, is not statistically measured, and it is not included in Africa's agricultural census. After pulp removal, a mature tree can produce up to 30 fruits per year, with each fruit yielding up to 10 kg seeds (Nwokolo, 1996). *Treculia africana* is a threatened species according to Merigini (2005).

The nutrient composition of African bread fruit is 14.23% protein; 0.22% ash; 91.25% moisture. 12.5% crude protein; 4.2% fat; 2.3% ash; 1.6% fibre; 73.0% carbohydrates (Akubor *et al*, 2000). The leaves of *T. africana* were found to contain 9.4% moisture, 2.0% fibre and 61.8% carbohydrate. The zinc content was quite high (837.00 + 0.10 mg/100 g) (Akubor *et al*, 2000). The fruits contain polyphenols. Phyllocoumarin, catechin and 6, 9-dihydroxy-megastigmane-3-one are phytochemicals isolated from *T. africana*.

The phytochemical component of African Breadfruit consists of flavonoid, anthranoids, phlobotanin polyphenols, anthraquinones, saponins, alkaloids, and cardiac glycosides (Osabor *et al*, 2009).

MATERIALS AND METHOD

Collection, Identification and Preparation of the plant

The plant (*Treculia africana*) was harvested by hand-picking in Baem Town, Khana Local Government Area of Rivers State, Nigeria. The plant was in October, 2021 and was transported using a ziplock bag to the Pharmacology laboratory, Rivers State University.

Method of Extraction

The *Treculia Africana* seeds were dried in a hot air oven at 40-45 °C and seeds were grinded. 50g of grinded *Treculia africana* seed and 500 ml of ethanoic was

measured and poured into a solvent extractor and extracted until the extract was formed. The extract was obtained using the rotary evaporator and the water bath to concentrate the extract before administration.

Experimental Animals and Management

A total of 20 male wistar rats (*Rattus norvegicus*) were obtained from an animal farm located at Etche, Rivers State. The wistar rats, each weighing between 120-160 grams, were housed in special cages (4 rats/cage) under standard laboratory conditions in the animal house of Human Anatomy, Rivers State University. The animals were allowed to acclimatize to laboratory conditions for four weeks before treatment started. During this period, the animals were fed twice daily with standard laboratory diet and tap water.

Study Design

A total of 20 male wistar rats were randomly selected and were grouped into 4 groups with 5 rats per group. The administration of *Treculia africana* seeds extract lasted for 14 days.

The LD₅₀ of *Treculia africana* is 450mg/kg of body weight (Aderibigbe and Agboola, 2010).

Group 1(control); received 5ml of distilled water

Group 2 (male low dose); received 250mg/kg of *Treculia africana* seed extract

Group 3 (male medium dose); received 300mg/kg of *Treculia africana* seed extract

Group 4 (male high dose); received 350mg/kg of *Treculia africana* seed extract

Sample Collection

After the experimental period of 14 days, the animals were anesthetized with ether.

Blood collection

Blood was collected (5ml from each rat) via heart puncture using a 5ml syringe. The blood was put into heparin and ethylene diamine tetra acetic acid (EDTA) bottles.

Analysis of Sample

Blood was used for hormonal analysis as described by Bolon *et al* (1997).

Statistical Analysis

Data are presented as mean ± SEM and were analysed using a one-way Analysis of Variance (ANOVA). P < 0.05 was declared as significant statistically.

RESULTS

Table 1: Effect of Ethanoic Extract of *Treculia Africana* on Testosterone in Male Wistar Rats.

Testosterone (ug/ml)	Mean ± SEM
Control	0.39 ± 0.01
Low dose	1.69 ± 0.01*
Medium dose	1.38 ± 0.02*
High dose	1.05 ± 0.01*

Table 2: Effect of Ethanoic Extract of *Treculia Africana* on Thyroid Stimulating Hormone in Male Wistar Rats.

Thyroid Stimulating Hormone (ug/ml) Mean \pm SEM	
Control	0.28 \pm 0.01
Low dose	0.31 \pm 0.01
Medium dose	0.99 \pm 0.01*
High dose	0.75 \pm 0.01*

Table 3: Effect of Ethanoic Extract of *Treculia Africana* on Prolactin in Male Wistar Rats.

Prolactin (ug/ml)	
Control	1.34 \pm 0.02
Low dose	0.38 \pm 0.01*
Medium dose	1.91 \pm 0.02*
High dose	1.39 \pm 0.02*

DISCUSSION

Testosterone is an important hormone in male reproductive system, because it enhances spermatogenesis. The study revealed significant increase in the mean values of testosterone levels at low, medium, and high dosages when compared with the control. The increase was observed to be statistically significant ($p \leq 0.05$) in experimental groups that received ethanoic extract of *Treculia africana* compared to the control group. It is worth noting that this increase in testosterone level was more in the experimental group that received the lowest dose of ethanoic extract of *Treculia africana*. These increase in the serum levels of testosterone could be due to dose dependant because the higher the dosage of the ethanoic extract of *Treculia africana*, the lesser the increase. While the lesser the dosage of the ethanoic extract of *Treculia africana*, the higher the increase in testosterone level (Table 1). Increase in serum levels of testosterone stimulate spermatogenesis and this planta extract increase the hormone testosterone and this could improve fertility in male who were facing infertility due to low sperm count and reduce sperm volume. This study is in consonant with previous study by Gbaranor *et al.*, (2022b), revealed that effect of *Treculia africana* seed extract on some spermatozoa parameters including sperm count, viability, morphology and motility proved to be beneficial in all cases where it was administered in low and moderate doses. The increase in serum levels of testosterone in this study is could be beneficial due to the role play by testosterone during spermatogenesis and this could promote other sperm parameters as spelled out by Gbaranor *et al.*, (2022b).

Thyroid stimulating hormone is a hormone produce by the anterior pituitary gland that stimulate the thyroid gland to produce thyroid hormones (T3 & T4). It was observed that the study revealed a significant increase in experimental groups that received medium and high dosages of ethanoic extract of *Treculia africana*. The increase in the medium dosage group was seen to be

higher than that of the highest dosage group. It can be deduced that the ethanoic extract of *Treculia africana* caused an increase in the levels of thyroid stimulating hormone. However, this increase the serum levels of TSH could be that the serum levels of T3/T4 in the animals was low and this in turn increase the serum the serum levels of TSH release due to feedback mechanism.

The levels of prolactin were observed to increase in this study. This increase was ruled to be statistically significant when compared to the control. The experimental group that received the medium dose of the ethanoic extract of *Treculia africana* showed more increase than the high doses respectively. This study agreed with previous study that revealed increase in serum levels of prolactin when *Cissus aralioides* was administered to the animals and this increase may suggests interference with the hypothalamic-hypophysial portal system or may be due to obstruction of dopamine by a potent substance in the extract. How ever, there is significant decrease in the serum levels of prolactin when low dose of the was administered. Prolactin is a hormone produced by the anterior pituitary gland and regulated by the hypothalamus. When prolactin is found in excess, it may delay fertility by suppressing gonadotropic hormones. Therefore, it may not be good for couples expecting children but may be good for nursing mothers who are unable to breastfeed their children due to inability of their breasts to produce milk despite presence of suckling reflex (Gbaranor *et al.*, 2021a)

CONCLUSION

A lot of men in the south-eastern part of Nigeria consume bread fruit both for its nutritional benefits as well as other ethnomedicinal purposes. The study revealed significant increase in the mean values of testosterone levels at medium, and high dosages and significant decrease in prolactin at low dose when compared with control. Again, there was significant increase in experimental groups that received medium and high dosages of ethanoic extract of *Treculia africana*. Also, the serum levels of prolactin were observed to be increased significantly when compared to the control. The experimental group that received the medium dose of the ethanoic extract of *treculia africana* showed more increase than the low and high doses respectively.

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