

Effects of *Xylopia Aethiopica* Fruits on reproductive hormonal level in rats

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ABSTRACT

Background: *Xylopia aethiopica* fruits locally called “uda” by the southern eastern part of Nigeria. This is highly valued plant in Igbo land. Among the Igbo’s; the fruits are used as spices; and aqueous decoction is used especially after child birth probably for its antiseptic properties and to arrest bleeding. **Objectives:** The present study was conducted to check the effect of *Xylopia aethiopica* extract on serum reproductive hormonal level in male rat. **Method:** 20 rats were divided into 2 groups (10 rats per group). Group I was control (untreated), while group II was given *Xylopia aethiopica* Fruits extract 80 mg/kg body weight intragastric twice per 7days for 28days respectively. **Results:** The levels of Follicle stimulating hormone, luteinizing hormone, testosterone, prolactin and estradiol was significantly decreased when compared with the control ($P < 0.05$) **Conclusion:** This result implies probably that the consumption of extract of *Xylopia aethiopica* in male may cause reproductive disorders

Key words: *Xylopia aethiopica*, reproductive hormone, rats

Introduction

The plant, *xylopia aethiopica* fruits locally called “uda” by the Igbo’s in the southern eastern part of Nigeria. This is a very important plant in Igbo land. Among the Igbo’s; the fruits are used as spices; and aqueous decoction is used especially after child birth probably for its antiseptic properties and to arrest bleeding. This plant has a wide spectrum of biological activities and have played a crucial role in traditional medicines because of their valuable physiological and pharmacological properties Nnodim *et al* (2011). The fruit have been found to contain volatile aromatic oil, fixed oil and rutin. It is used in the treatment of digestive system hypermotility (diarrhoea), bronchitis, stomach aches, febrile pains and rheumatism. This fruit of *xylopia aethiopica* has been reported to act as antioxidant, hypolipidemic and hypoglycaemic agent hence, confirming to its use as an antidiabetic agent (Ameyaw, Y., E. Owusu-Ansah, 1998). Most of these plants contain many bioactive chemical substances that produce definite physiological and biochemical actions in human body (Cho, E., *et al.*, 2004). These bioactive constituents are alkaloids, tannin, flavonoid; Phenolic compound etc (Edeoga, H.O., *et al.*, 2005). Plant derived natural products have received considerable attention in recent years due to the diverse pharmacological properties including antioxidant and antitumor activity (Karthikumar, S., *et al.*, 2007). However, some plants can have different effect in the sex organ. This area of study on the effect of *X. aethiopica* on sex hormone is very rare. Hence, the level of male hormones are evaluated in male wistar rats to provide information whether taking *X. aethiopica* could be beneficial or not to the male.

Material and Method

Plant materials: The *Xylopia aethiopica* fruits were obtained from Ekeonunwa market in Owerri Nigeria. The botanical identification and authentication was confirmed by Head of Department of Plant Science and

Biotechnology, Imo State University, Owerri. The plant material was sun dried for seven days. The dried fruit of *Xylopia aethiopica* were milled to get a coarse powder used for the extraction of the powder were macerated in a 400g percolator with 250ml of distilled water. The mixture was allowed to stand for 48 hours after which it was filtered and 80mg concentration was used.

Experimental Animals: The male Wistar rats weighing between 150 and 220g (ages 8 to 10 weeks) were used in this study. These animals were obtained from the Animals House of College of Medicine and Health Science, Imo State University Owerri Nigeria following the institutional ethical approval. They were kept under standard laboratory conditions, fed with commercial growers mash, product of Top feeds LTD, Sapele Nigeria. Water and feeds were provided *ad libitum*. The animals were left for two weeks to acclimatize and then divided into two groups for experimentation.

Experimental Design: The animals were randomly assigned to two experimental groups ($n=10 \times 2$ group). The first group of animals which served as control was given distilled water. Group II was given 80mg/kg

body weight for 14days. In all both groups, the extract was administered through oral route. This treatment was by oral compulsion. All animals were allowed free access to food and water through out the experiment.

Blood Collection: Twenty four hours after the last doses were administered the animals were anaesthetized with chloroform vapour, quickly brought out of the jar and sacrificed. Whole blood was collected by cardiac puncture from each animal into clean dry test tubes. The blood in the clean dry test tubes were allowed to stand for about 15minutes to clot and further spun in a westerfuge centrifuge (Model 1384) at 10,000g for 5minutes, serum was separated from the clot with Pasteur pipette into sterile sample tubes for the measurement of hormonal profile

Serum analysis of hormone:

Serum level of follicle stimulating hormone (FSH), estradiol testosterone, luteinizing hormone (LH), and prolactin was estimated using enzyme immunoabsorbent assay through kits.

Statistical analysis: The results were expressed as mean \pm standard deviation. The statistical evaluation of data was performed by using students t- test.

Table 1: Effect of *Xylopia aethiopica* on serum follicle stimulating hormone (FSH), luteinizing hormone (LH), testosterone, estradiol and prolactin in rat

Treatment	FSH (mg/dl)	LH (mg/dl)	Testosterone (mg/dl)	Prolactin (mg/dl)	Estradiol (mg/dl)
Control	17.5 \pm 0.9	32.6 \pm 2.11	52 \pm 4.18	22.7 \pm 7.12	33.1 \pm 5.61
80 mg/kg bw X.aethiopica	14.9 \pm 1.66*	28.2 \pm 5.91*	49.7 \pm 5.32*	17.91 \pm 4.16*	24.52 \pm 6.10*

*Significantly different from control at $P < 0.05$

Discussion:

Researches on herbal medicine have attained an incredible global level in the recent past. The application of some plants constituents in pharmaceutical industries has gone long way in the elevation of the status of the traditional herbal medicine in Africa and in Nigeria in particular (Edeoga, H.O., *et al.*, 2005). The need for fertility regulation in men cannot be overemphasized. While chemical methods for fertility regulation in woman are readily available. The “male pill” remains a distant prospect as effective contraceptive regimens are still toxic and inconvenient. Acceptable male contraceptive methods should reduce the burden traditionally placed almost exclusively on the female partner.

In this study, the results obtained showed that the level of serum testosterone, luteinizing hormone (LH), follicle stimulating hormone (FSH), estradiol and prolactin were significantly decreased in male rats administered with *X. aethiopica* extracts when compared with the control. This probably imply that *X. aethiopica* plants play important role in regulation of hormonal level which in other words cause reproductive disorders. FSH is an important hormone that stimulates spermatogenesis while LH stimulates the production of testosterone in Leydig cells, which in turn may act on the Sertoli cells and peritubular cells of the seminiferous tubules and also stimulates spermatogenesis. Alterations in endocrine function in conjunction with the use of *Xylopia aethiopica* has caused considerable concern. It is observed that exposure to *X. aethiopica* has significant effect on depressed hormonal secretion. LH and FSH secreted by the pituitary gland are of major importance in reproduction in the male. This could be associated with the blockage of gonadotropin release which lead to low LH and FSH which are responsible for reduced testosterone production by the leydig cell of the testis. This is in line with the work of Harclerode (Harclerode, J., 1984; Block, R.I., *et al.*, 1991). Similar results were obtained in male mice studies with decreased plasma testosterone due to inhibition of pituitary LH release as well as decreased plasma FSH (Mendal, T.K. and N.S. Das, 2009; Dalterio, S., *et al.*, 1978; Mukhtar, A.H., *et al.*, 2012) Therefore, the depletion of these hormones may pose serious reproductive disorders in male.

References

- Ameyaw, Y., E. Owusu-Ansah, 1998. Morphohistological studies of two plant species used in Ethnomedicine. *J Herds, spices Med Plants*, 5(4): 60-85.
- Block, R.I., R. Fairnpour and J.A. Schlechte, 1991. Effects of chronic marijuana use on testosterone, luteinizing hormone, follicle stimulating hormone, prolactin and cortisol in men and women. *Drug Alcohol dependence*, 28: 121-128.
- Cho, E., J. Seddom, B. Ronser, W. Willet, S. Hankinson, 2004. Prospective study of intake of fruits vegetables, vitamins and carotenides and related muscucopathy. *Arch ophtha*, 122: 883-892.
- Dalterio, S., A. Barke, C. Roberson, D. Watson and S. Burstein, 1978. Direct and pituitary mediated effects of THC and cannabiniol on testis. *Pharmacol Biochem Behav.*, 8: 673-678.

- Edeoga, H.O., D.E. Okwu, B.O. Mbaoble, 2005. Phytochemical constituents of some Nigerian Medicinal plants. *African J Biotechnol*, 4(7): 685-688.
- Edeoga, H.O., D.E. Okwu, B.O. Mbaoble, 2005. Phytochemical constituents of some Nigerian Medicinal plants. *African J Biotechnol*, 4(7): 685-688.
- Herclerode, J., 1984. Endocrine effect on marijuana in the male preclinical studies. *Nida Res Monogr.*, 44: 46-64.
- Karthikumar, S., K. Vigneswari, K. Jegatheesan, 2007. Screening of antibacterial and antioxidant activities of leaves *Eclipta prostrate*. *Scientific Research and essay.*, 2(4): 101-104.
- Mendal, T.K. and N.S. Das, 2009. Testicular toxicity in cannabis extract treated mice. Association with oxidative stress and role of antioxidant enzyme system. *Toxicol. Ind. Health*, 26: 11-23.
- Mukhtar, A.H., N.M. Elbagir and A.A. Gubara, 2012. Sex hormone levels as influenced by cannabis sativa in rats and men. *Pak J Nutrition*, 11(5): 419-422.
- Nnodim, J.K., A. Emejulu, A. Amaechi and E.C. Nwosu Njoku, 2011. Influence of *Xylopia Aethiopica* Fruits on Some Hematological and Biochemical Profile Al Ame en J Med Sc., 4(2): 191-196.