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Effect Of Leave Extract Of Jatropha Tanjorensis On The Testis Of Wistar Rats

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Abstract: *Jatrophatanjorensisis a medicinal plantwhich has been applied to cure many ailments. Its family members - Euphorbiaceae, contain several toxic substances. This study is aimed at investigating the effect of aqueous extract of J. tangorensison the testes of adult wistar rats.A total of twenty four (24) male wistar rats were used for the study. The animals were separated into three experimental groups with eight rats in each group. Group I was the control group, Group II and III were used as the treatment groups. The group I rats were given normal feed and water ad libitum. Group II rats were also given normal feeds as in group I above, but in addition were administered the extract in two different dosages. Group IIA were given 500mg of the extract per kilogram body weight (mg/kg b. wt.) daily for 14 days while group IIB had 1000mg/kg b.wt. daily for 14 days. Testes of those in group IIA treated with 500mg of the extract showed slight increment in spermatozoa in the seminiferous tubules while those in group IIB treated with 1000mg for 2 weeks showed more increase in sperm cells. Group IIIA treated with 500mg for 3 weeks showed greater increase in sperm cells and the lumen of the seminiferous tubules were almost completely enclosed by the tail of the spermatozoa while the testes of those in group IIIB treated with 1000mg for 3 weeks showed increased sperm cells. It can be deduced that Jatrophatanjorensis may have the potential of enhancing spermatogenesis when consumed for a short period of time, and this was dose dependent.*

Keywords: *Jatrophatanjorensis, Testes, Sperm cells, Wistar rats*

I. Introduction

Some plants, apart from serving as food, have also been known to exhibit medicinal properties [(1, 2)], the plant *Jatrophatanjorensis* is not an exception. Over 400,000 species of tropical flowering plants have medicinal properties; a factor that may has made traditional medicine cheaper than modern medicine [(3)].

However, these plants with helpful nature could also be dangerous and detrimental to health if we neglect the fact that some of them that are helpful in healing or curing ailments could also have negative side effects either on the particular organ in which they act or to another organ in the body or even both [(4)].

*Jatrophatanjorense*is a common weed of field crops, bush re-growth and a gregarious shrub of about 1.8 meters in height and are usually grown in the higher rainfall forest zones in West Africa. It belongs to the family Euphorbiaceae and is widely grown in Southern Nigeria. It has been given different local names by different folks from different geographical regions and some of these names include *Iyana-Ipaja, lapalapa*, and "*hospital too far*" which it is popularly called by the local folks in Benin [(5, 6)].

Different parts of *Jatrophatanjorensis*have been found useful in the treatment of fever, eczema, itches, visceral diseases, stomachache, and sores on the tongues of babies [(7)]. In some parts of Nigeria the leaves of *Jatrophatanjorensis* are locally consumed as vegetable added to daily meal, and also in the Southern Nigeria the leaves of *Jatrophatanjorensis* have been used for the treatment of diabetes mellitus as it is said to possess anti hyperglycaemic effect [(8)]. The leaf extract has hypoglyceamic and antioxidant properties that make it a popular remedy for the treatment of diabetics, malaria and hypertension in this region. It was reported that administration of *Jatrophatanjorensis*leaf powder to rabbits resulted in improvement in haematological indices which revealed an enhancement of bone marrow function [(9)].

Although plant based natural medicines are popularly acclaimed to be safe, scientists advocate for proper toxicological studies in other to ensure safety in their use [(2)].

Jatrophatanjorensis, like many members of the family Euphorbiaceae, contain several toxic compounds, including lectin, saponin, carcinogenic phorbol, and a trypsin inhibitor. The plant also exhibits low hemaglutination properties indicating low toxicity on red blood cell. Recent claims have it that the plant is no longer safe for use and that it could be toxic to organs in the body [(10)].

The testes (testicles) are the male gonads .They are two oval shaped organs located in the scrotum[(11)]. They are the most essential organs of the male reproductive system. They are the glands where sperm - the male

reproductive cell which fuses with the egg cell in females during fertilization and gives rise to a new organism known as zygote; and testosterone - a hormone responsible for the proper development of male sexual characteristics, maintaining muscle bulk, adequate levels of red blood cells, bone growth, a sense of well-being, and sexual function, are produced [(12)]. This implies that whatever affects the testes can influence sexual characteristic and fertility.

The responsibility of male factor in couple's infertility has been exponentially rising in recent years due to a comprehensive evaluation of reproductive male function and improved diagnostic tools. Several conditions that interfere with (the process of formation of sperm cell) and reduce sperm production and quality can lead to azoospermia (lack of spermatozoa in semen),[(12)].

However it has also been said by this same consumers that the leaves have a negative effect of damaging the liver and causing liver enlargement. Moreover, it has been said that consumption of the seeds of *Jatrophacurcas*can causes acute abdominal pains, burning sensation in the throat, diarrhea and vomiting [(13)]. Therefore, this research is aimed at investigating the effects of aqueous leaf extract of *J. tangorensis*on the testes of adult wistar rats.

II. Materials And Method

Experimental Animals

A total of twenty four (24) male animals wistar rats were obtained when they were very young from the Department of Anatomy, University of Benin, Benin City. These rats were fed and nurtured to adulthood attaining an average weight of two hundred to two hundred and fifty grams (200-250g). They were kept and maintained in the Animal House of Anatomy Department, University of Benin. They were fed with top feed growers mash and water which were given ad libitum, and all the animals were carefully assessed and confirmed to be free of any pathological condition following the period of maturation/acclimatization which lasted for two (2) months. When the animals were ready for use, they were grouped into three experimental groups. Group I was the control group, Group II and III were used as the treatment groups. The treatment groups (i.e. group II and III) were further divided into sub groups IIA, IIB, IIIA, and IIIB.

III. Plant Collection And Identification

The leaves of *Jatrophatanjorensis* were obtained within the University of Benin premises in large quantities and were authenticated at the Department of Botany, University of Benin, and were taken to Pharmacognosy Laboratory for extraction.A large quantity of the leaves were collected and were air dried indoor, and were then put in an oven at about 40^0C. Thereafter, it was grinded into powder. 1kg (1000g) of the grinded leaves were collected and soaked with about 1,200 ml of distilled water for about 72hrs in a chromatographic jar, filtration was done and the residue was removed while the filtrate was concentrated in an evaporating dish with boiling water in a water bath. After concentration by evaporating, the fluid extract was collected and weighed 85g.

IV. Experimental Protocols

The animals were separated into three experimental groups with eight rats in each group (see Table 1 below). Group I was the control group, Group II and III were used as the treatment groups.The groupI rats were given their normal feed and water ad libitum.Group II rats were also given their normal feeds as in groupI above, but in addition were administered the extract in two different dosages and for duration of two weeks.Group IIA were given 500mg of the extract per kilogram body weight (mg/kg b. wt.) daily for 14 days while group IIB had 1000mg/kg b.wt. daily for 14 days.Similarly, rats in group III were given their normal feeds as in group I above, but in addition were administered the extract in two different dosages of 500mg/kg b.wt. and 1000mg/kg b.wt. for a duration of three weeks. Group IIIA were given 500mg/kg b.wt.while group IIIB received 1000mg/kg b.wt.The animals in each group were sacrificed at the end of two and three weeks respectively.

Table 1: Summary of Experimental Protocols

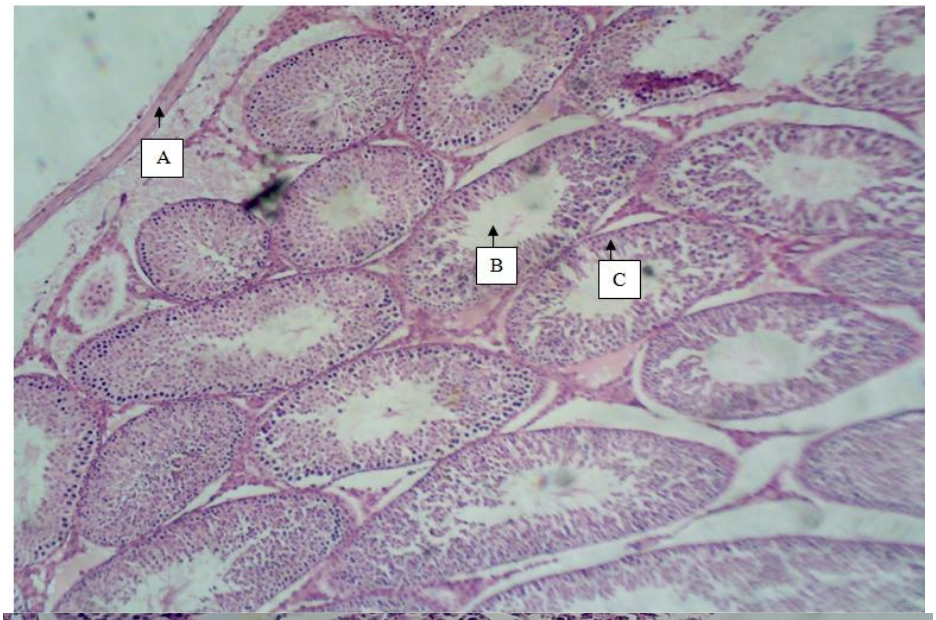
EXPERIMENTAL GROUPS	Group I (control group)	Group II (treatment group)		Group III (treatment group)	
SUB GROUPS	NIL	Group II A	Group II B	Group III A	Group III B
NUMBER OF RATS	8	4	4	4	4
DURATION	14 and 21 days respectively	14 days	14 days	21days	21days
DOSAGES RECEIVED IN mg/kg b.wt.	No extract was administered	500	1000	500	1000

A summarized table showing how the experimental animals were grouped, concentration of dosages received and duration of administration.

The animals were anaesthetized in a chloroform saturated chamber and while under anesthesia, the abdomen was cut open to the pelvic region and the testes were harvested and immediately fixed in bouin's fluid for histological studies. Histological investigations were carried out using standard protocols.

V. Histopathological Findings

Plate 1. Histological section of the testes of the control group showing the tunica albuginea, A, the lumen of the seminiferous tubules, B, and the interstitial spaces, C (H&E 40x).



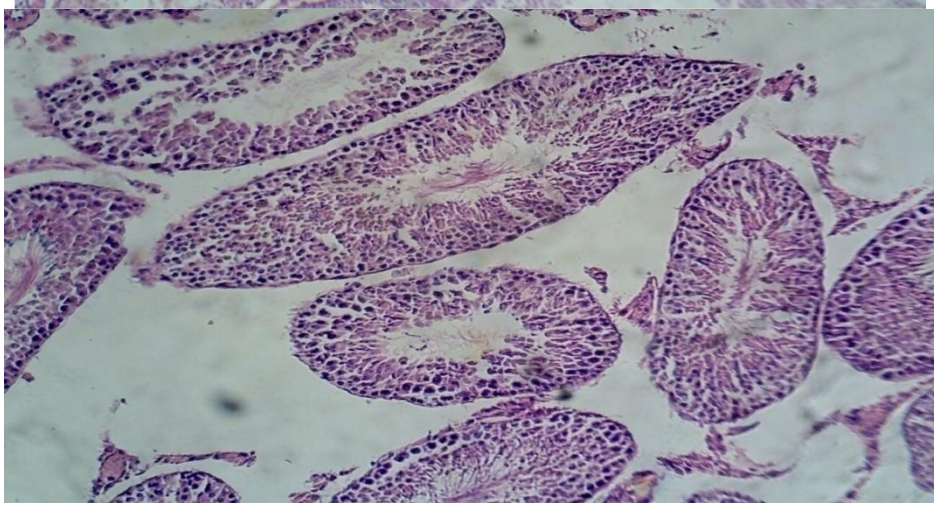


Plate 2. Testes of those in group IIA treated with 500mg of the extract showing slight increment in spermatozoa in the seminiferous tubules (H&E 100x).

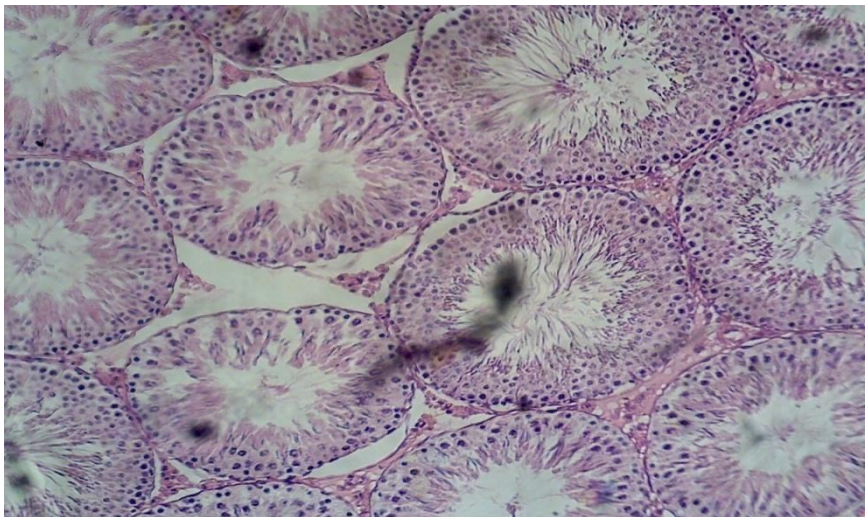


Plate 3. Testes of those in group IIB treated with 1000mg for 2 weeks showing increase in sperm cells compared to those in group IIA above (H&E 100x).

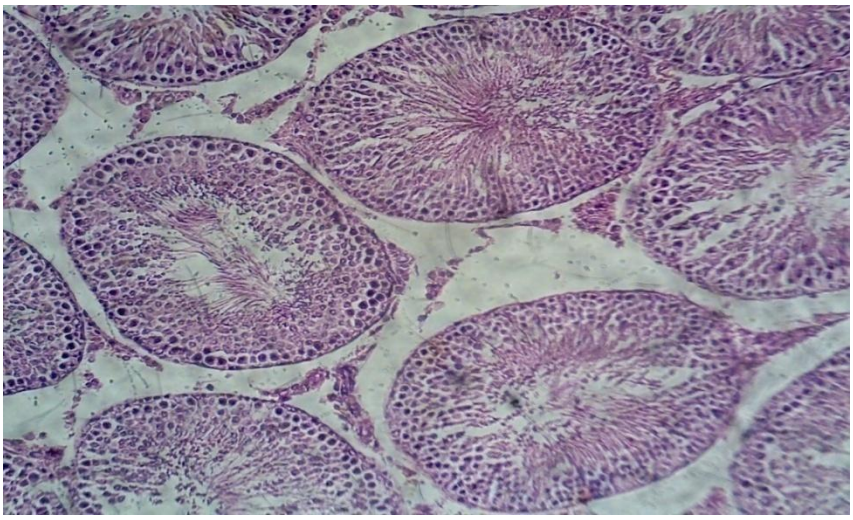


Plate 4. Testes of those in group IIIA treated with 500mg for 3 weeks showing increase in sperm cells compared to those in group II above. And as it can be observed here that the lumen of the seminiferous tubules are almost completely enclosed by the tail of the spermatozoa (H&E 100x).

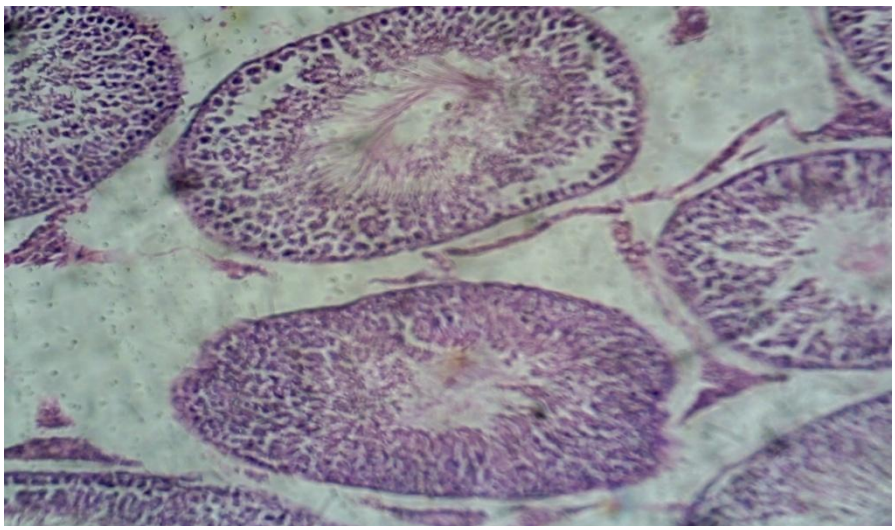


Plate. 5. Testes of those in group IIIB treated with 1000mg for 3 weeks showing sperm cells compared to those in group II above (H&E 100x).

VI. Result And Discussion

During the process and period of administration, all the animals were intact and there was no incidence of abnormal behavior by the experimental animals. During sacrifice, when the organs were harvested it was observed that the blood vessels in the testes of the treatment groups were seen to be more prominent and conspicuous compared to those of the control group, and this may be as a result of dilatation of the blood vessel which may thus cause more blood flow to the testes of the treatment groups.

From the results, it was observed that the treatment groups showed increased sperm cells in the seminiferous tubules compared to those of the control groups. This increase was both dose and duration dependent as exemplified by groupIIIB rats. As the dose of the extract consumed increase, there were more sperm cells filling the lumen of the seminiferous tubules to the extent that the lumen was almost occluded by the tails of the spermatozoa (PLATES 4 and 5). The presence of more spermatozoa in the lumen of the seminiferous tubules of the treatment groups may be as a result of the dilated blood vessels to the testes, which could have possibly enhances blood supply to the testes (i.e. increase in blood flow to the testes) and thus consequently enhances the process of spermatogenesis.

Leaf extract of *Jatrophatanjorensis*have been reported toposse phytochemical ingredients capable of lowering blood cholesterol level and might be useful in the treatment of cardiovascular diseases caused by hyperlipidemia [(14)]; this is a positive effect of the leave extract on cardiovascular system.

The wide usage of the leaves of J. tanjorensis in folkloric medicine has been attributed to its high phenolic content which could be exploited in the global fight against degenerative diseases, whose etiology has been linked to oxidative stress. The antioxidant properties of the leaves of J. tanjorensis is because of its active ingredient i.e. free and bound phenols which has demonstrated potent but dose-dependent free radical scavenging activity against both hydroxyl and 2,2-diphenyl-1-picrylhydrazyl (DPPH) radicals[(15)].

Oliveira et al., [(16)]in their study showed that aqueous and ethanol extracts of JatrophadioicaCerv. can be used as a potential antifungal agent with low cytotoxicity.

Base on the foregoing *Jatrophatanjorensis*has good potential in the management of cardiovascular disease while *JatrophadioicaCerv*is good in the management of fungal diseases.

In this very study, *Jatrophatanjorensis*may be useful in the management of infertility in the males because of its potential to increase sperm cells in the experimental group compared with the normal/control group; however other microscopic findings indicate vascular congestion which was peculiar to those in group IIA, complete obliteration of the blood vessels (End arteritis obliterans) which was peculiar to those in group IIB, dilatation of the blood vessels and thickening of the wall of the blood vessels which was also peculiar to those in group IIIA and IIIB. All these may have been the reason for the prominence and conspicuous blood vessels observed in the testes of the treated group as earlier stated.

VII. Conclusion

Based on the results and findings in this research, it can be deduced that *Jatrophatanjorensis* may have the potential of enhancing spermatogenesis when consumed for a short period of time, and this was dose dependent.

VIII. Recommendation

According to this research, *Jatrophatanjorensis* may enhance spermatogenesis. However its long term effect on spermatogenesis with higher doses has not been proven. It is therefore recommended that more research should be carried out on this line of study in other to counter or confirm these findings and also to know the fate of the testes when it is consumed for a longer duration. Moreover, since the leaves are edible in some parts of the world irrespective of its toxicity, hence, it is recommended also that it should be consumed in small quantities and for a short period of time if it must be consumed.

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