

Full Length Research Paper

Sexual stimulatory effects of aqueous stem bark extract of *Lophira laceolata* in male Sprague Dawley rats

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Accepted 24 September, 2009

***Lophira laceolata* stem bark extract is commonly used by Herbal practitioners in Sokoto State, Nigeria to treat erectile dysfunction. The effect of oral administration of aqueous stem bark extract of the plant on sexual activity was investigated in male Sprague Dawley rats. Three doses (100, 200 and 300 mg/kg b. wt.) of the extract were administered to three groups of male Sprague Dawley rats and the sexual stimulatory effect as adjudged by mounting frequency (MF), mating, number of penile erection and ejaculation in the animals were recorded. The extract produced a significant ($P < 0.05$) and dose dependent increase in the listed parameters. The effect was compared to that of sildenafil a standard sexual performance enhancing agent and was shown to possess advantage of producing sexual enhancement in a sustained manner over sildenafil. This plant extract has the potentials of being developed into a sex performance enhancing drug. This finding supports the traditional use of this plant for the treatment of erectile dysfunction.**

Key words: *Lophira laceolata*, erectile dysfunction, sexual enhancement.

INTRODUCTION

Erectile dysfunction [ED] often referred to as impotence is defined as, when a man consistently is unable to attain or maintain a penile erection sufficient for satisfactory sexual performance (Sanchez-cruiz and Martins-Morales, 2003; Adaikan and Guathamou, 2000). The causes of ED include: Psychological disturbances, hormonal imbalances, genital vascular disorder and neural influence (Sahelian, 2004). Erectile dysfunction has been estimated to affect about 150 million men world wide and its prevalence increased with age (Aytac et al., 2008). It is estimated that Nigeria has about twelve million infertile persons (Giwa-Osagie et al., 1990). Erectile dysfunction may be responsible for a reasonable percentage of these.

The maintenance of sexual potency and interest in sex has always been a major concern to man. Alcohol is reported to be the oldest sexual stimulant (Low et al., 2004). The contemporary approach in pharmacologic

management of erectile dysfunction can be traced to the discovery, in the early 1980s, of injectable vasoactive drugs (papavarine, phentolamine) capable of producing firm and lasting erections (Brindley, 1983). Phosphodiesterase type-5 (PDE-5) inhibitors are new class of vasoactive drugs developed for the treatment of ED (Rosen et al., 2002). The oral administration of PDE-5 is accompanied by varying side effects, including headaches and blurred vision (Wing-hang, 2005).

Many sexual stimulants are in the form of plant based or synthetic drugs. Ginseng and yohimbine are plant based aphrodisiac which increase sex-drive and/or sexual pleasure (Thody et al., 1981). The use of plant extracts as fertility enhancer in animals and human is now being widely accepted (Dada and Ajilore, 2009). This stimulates our interest to investigate *Lophira lanceolata*. The plant is commonly known as iron wood. It belongs to the family, Ohanacea, distributed in west and central Africa including the northern states of Nigeria. The local names of the plant in Nigeria include: Namijin Kande in Hausa, Ikponhon in Yoruba, Okpopia in Igbo and Magan-chi in Nupe. The plant is native to Africa (Abdullahi et al., 2003). The stem bark of the plant has been reported to

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contain tannins, alkaloids, resins, saponin and flavonoids (Gill, 1992). The plant is used locally in Sokoto for the treatment of erectile dysfunction in males. The present study examined the sexual stimulatory effect of aqueous stem bark extract of the plant in male Sprague Dawley rats.

MATERIALS AND METHODS

Preparation of the plant extract

Lophira lanceolata was collected in June 2008 from its natural habitat at Fakon Idi area in Sokoto North Local Government area of Sokoto State, Nigeria. It was authenticated by a botanist in the Biological Sciences Department, Usmanu Danfodiyo University, Sokoto (UDUS). A specimen of the sample was labeled and deposited at the Herbarium of Pharmacology Department, UDUS. The stem bark was separated, cleaned and air dried to a constant weight. The dried material was pounded with mortar and pestle to form a dry powder. The extraction was carried out by weighing 250 g of the powder plant material into 3.75 l of distilled water in a conical flask. The mixture was heated to about 50°C allowed to cool for 6 h with only intermittent shaking of the container. Filtration was done using Whitman filter paper. The filtrate was concentrated in an oven maintained at a temperature of 50°C. The percentage yield was calculated and the filtrate was then stored in a deep freezer at -15°C and the required concentrations were reconstituted when needed for the experiments.

Drug preparation

Sildenafil (Ranbaxy Lab. Ltd. India, Batch No. 1854334, 100 mg tablet) was purchased from a local pharmaceutical company in Sokoto. The tablets were finely powdered and suspended in distilled water at a concentration of 5mg/ml and administered at a dose of 5 mg/kg body weight.

Experimental animals

Adult male and female *S. dawley* rats weighing between 168 - 200 g were sourced from Faculty of Veterinary Medicine of Ahmadu Bello University, Zaria, Nigeria. The animals were kept in cages, fed with rat pellets (Nemeith Livestock Feeds, Nig. Ltd) and given free access to tap water for 14 days in the animal Facility of Pharmacology Department, UDUS before the commencement of the experiment.

Animal treatment

Five indices namely: mounting frequency, mating, penile erection, intromission and ejaculation were assessed as indicators of sexual stimulatory activity in the experimental rats (Tajuddin et al., 2005).

Mounting frequency

Twenty five adult male Sprague Dawley rats were randomly selected and used for this study. The rats were divided into three treatment and two control groups (n = 5) and housed in separate cages. The animals in groups 1 - 3 were treated with 100, 200 and 300 mg/kg respectively of aqueous stem bark extract of *L. lanceolata* orally for 7 consecutive days while those in group 4 were given distilled water (normal control) and those in group 5 treated with

sildenafil (positive control) (Tajuddin et al., 2004). On the 8th day, each male rat was pulled out and placed individually in a separate cage for 15 min. Thereafter, one non estrous female rat was introduced into each cage (female rats do not allow mating during non estrous period) and the number of attempted mount by the male rats were counted and recorded during 15 min observatory period [1st mounting]. The female was separated for 15 min and then reintroduced again. The number of attempted mount was again recorded for another 15 min (2nd mounting). This was repeated for each rat in both the treatment and control groups.

Mating assessment

This study was carried out according to the method Ecksterin et al. (1960). Five adult male rats weighing between 168 - 200 g were divided into 5 groups (5 animals each) and labeled A - E. The treatment groups A - C received 100, 200 and 300 mg/kg (b.wt.) respectively of the extract orally. The extract was administered in the evening and each male rat was placed in a separate cage. After 1 h, 5 estrous female rats were admitted into each cage to cohabit with one male overnight. The female rats allow mating only during estrous phase and the estrous phase was determined in the rats by microscopic examination of vaginal smears (Tajuddin et al., 2004). After overnight cohabitation, the vaginal smear of each female rat was examined under a microscope at x 40 objective lens for the presence of sperm. The numbers of sperm positive female were recorded in each group. The animals in groups D and E were treated with sildenafil and distilled water to serve as positive and normal controls respectively.

Test for libido

This test was carried out according to the method of Davidson (1981), modified by Amin et al. (2001). 25 adult male rats were selected for this study. They were divided into 3 treatment and two control groups. The animals in the treatment groups were given 100, 200 and 300 mg/kg of the extract orally respectively for 7 days. Those in normal control group received equivalent volume of distilled water and the animals in the positive control group were treated with sildenafil (5 mg/kg). The rats were separated and placed individually in a cage on the 7th day; five estrous female rats were introduced to pair with each male rat. The animals were observed for 30 min for mounting frequency [MF], penile erection, intromission and ejaculation (sperm positive females).

Statistical analysis

Data were expressed as mean of five replicates plus or minus standard deviation (M ± SD) and were subject to one way analysis of variance (ANOVA). Values were considered statistically significant at P < 0.05.

RESULTS

The administration of 100 - 300 mg of aqueous stem bark extract of *L. lanceolata* produced a significant increase (P < 0.05) in the sexual activity of male Sprague Dawley rats. The mounting frequency of the animals treated with 300 mg/kg of the extract in the first 15 min were more than 3 times that of the normal control group and about twice that of the positive control group (Table 1). The extract produced a higher effect during the 2nd mounting

Table 1. Effect of stem bark extract of *L. lanceolata* on mounting and mating frequencies of male Sprague Dawley rats.

Treatment (mg/kg)	Parameters		
	1 st mounting	2 nd mounting	Mating
Control	9.00 ± 3.35	7.67 ± 5.28	8.00 ± 2.34
Extract (100)	19.50 ± 4.97	19.33 ± 3.20	21.33 ± 3.67
Extract (200)	18.67 ± 2.73	23.67 ± 4.03	25.33 ± 2.16
Extract (300)	32.50 ± 6.72	33.50 ± 7.97	31.67 ± 4.93
Sildenafil (5)	16.83 ± 2.67	8.35 ± 2.00	24.21 ± 3.20

Values = means of 5 replicates ± SD; P < 0.05; (treatment vs. control).

Table 2. Effect of *Lophira lanceolata* stem bark extract on erection, intromission and ejaculation of male Sprague Dawley rats.

Treatment (mg/kg)	Parameters		
	Erection	Intromission	Ejaculation (sperm +ve)
Control	2.58 ± 1.01	0.33 ± 0.52	0.17 ± 0.41
Extract (100)	3.53 ± 0.69	4.10 ± 1.41	0.33 ± 0.52
Extract (200)	5.70 ± 1.76	6.00 ± 0.10	0.67 ± 0.52
Extract (300)	7.30 ± 1.09	6.35 ± 1.41	1.00 ± 0.00
Sildenafil (5)	4.83 ± 0.54	4.32 ± 0.52	0.58 ± 0.34

+ve = positive; P < 0.05 (treatment vs. control).

than sildenafil, a standard sexual performance enhancing drug. The number of penile erection, intromission and ejaculation (number of female rats with positive sperm deposit) also increased correspondingly with the concentrations of the extract (Table 2).

DISCUSSION

This study examined the effect of oral administration of *L. lanceolata* stem bark extract on the sexual activity of male Sprague Dawley rats. The administration of the extract significantly (P < 0.05) increased the 1st and 2nd mounting frequencies of the male rats. The effect of the extract at 300 mg/kg was higher and strikingly different from that of sildenafil which showed improvement only during the 1st mounting period. This suggests that, the extract can intensify sexual activity in a sustained manner (Tajuddin et al., 2005). The extract has been previously reported to enhance spermatozoa indices in experimental animals (unpublished).

The other parameters like penile erection, intromission and ejaculation frequencies used as indicators of sexual behaviours were also examined in this study. The extract significantly and dose dependently increased the frequencies of these parameters. Hadidi et al. (2003) reported the stimulatory effect of *Ferula harmonies* root extracts on copulatory behaviour of male rats. The increase in sexual behaviour of the experimental animals

induced by *L. lanceolata* stem extract may be as a result of increase in serum levels of testosterone or alpha-2-adrenoreceptors inhibition. A previous study has shown that, administration of *L. lanceolata* stem extract induced an increase in serum testosterone level in rats (Unpublished). The aqueous extract of *Fadogia agrestic* stem bark was reported to increase sexual behaviours in experimental animals by increasing the serum testosterone levels (Yakubu et al., 2005). Yohimbine made from the bark of tropical West African tree (*Corynanthe yohimber*) is an alpha-2- adrenoceptor antagonist that has long demonstrated modest efficiency of sexual stimulation in animals and humans (Thody et al., 1981).

This study has shown that, aqueous stem bark extract of *L. lanceolata* is capable of enhancing sexual behaviours following oral administration in male Sprague Dawley rats and these findings support the local use of the plant extract to treat erectile dysfunction.

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