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EVALUATION OF APHRODISIAC POTENTIAL OF *Pseudarthria viscida* (L) WIGHT AND ARN. (FABACEAE) ROOT EXTRACT ON MALE RATS

Christopher Sakala*,
Yassa Piere Yoniene,
Kiran Kumar Angadi[1]
D. Satheesh Kumar[2]

School of Pharmacy,
Apex Medical University,
Lusaka, Zambia.

[1]Department of Biotechnology,
Acharya Nagarjuna University,
Guntur, India

[2]NIRT, Indian Council of Medical Research, Chennai, India

ABSTRACT

In the present study we explored the aphrodisiac properties of Pseudarthria viscida (L) Wight and Arn. (Fabaceae) roots by observing the sexual behavior of male rats. Toxicity study was performed to establish the therapeutic index of the extracts, showed that a high dose of the extract (2 g/kg body weight) caused no mortality or changes in rats' behavior. The ethanolic extract of roots of Pseudarthria viscida (EEPV) at the dose of 400 mg/kg, p.o and sildenafil citrate at the dose of 5 mg/kg,p.o were administered to the male rats. Mount latency (ML), intromission latency (IL), ejaculation latency (EL), mounting frequency (MF), intromission frequency (IF), ejaculation frequency (EF) and post ejaculatory interval (PEI) were the parameters observed before and during the sexual behaviour study at days 0, 10, 20, 30 and 40. The ethanolic extract of roots of Pseudarthria viscida reduced significantly ML, IL, EL and PEI ($p < 0.05$). The ethanolic extract of roots of Pseudarthria viscida also increased significantly MF, IF and EF ($p < 0.05$). These effects were observed in sexually active and inactive male rats.

Keywords: *Pseudarthria viscida*, Aphrodisiac, Sexual behavior, Roots.

INTRODUCTION:

Aphrodisiacs are the substances which are used to increase sexual activity and help in fertility. Sexual feelings are an inevitable part of life. The basic and fundamental purpose of sex and sexuality is the "continuation of progeny" and the survival of human race1. The sex is the most intimate, indispensable and an integral part of every individual and can be a source of pleasure and fulfilment. Infertility is a worldwide medical and social problem. It affects above 10-15% of married couples. WHO estimates that there are 60-80 million infertile couples worldwide. Infertility in itself may not threaten physical health but it can certainly have a serious impact on the mental and social wellbeing of infertile couple2.

Management of erectile dysfunction includes counselling of patient by an experienced psychiatrist or psycholo gist to restore confidence and improve patient's ability to obtain adequate erection, the use of Vacuum Erection Devices, the use of surgical penile implants, hormonal treatments mainly with testosterone, or the use of specific drugs such as Sildenafil (Viagra) which increases firmness, maintenance of erection, frequency of orgasm and level of desire3,4. Side effects of these treatments include high cost, complications such as infections in surgical procedures, mechanical failure of devices, acceptability, side effects of drugs such as headache, flushing, dizziness, visual disturbances, nasal congestions and priapism. There are numerous

Address for correspondence

Dr. Christopher Sakala
Dean
Faculty of Pharmacy, Nutrition and Dietetics.
Lusaka Apex Medical University, Lusaka, Zambia

reports of aphrodisiac activity exhibited and proven by plants[5-7].

Pseudarthria viscida (L) Wight and Arn. (Fabaceae)8 is a shrub. In the traditional medicine it is used in the preparation of Ayurvedic medicines namely, 'Dashamoola' 'Mahanarayana Taila' and 'Dhantara Taila'9. It is used in the treatment of vitiated conditions of pita and vata, asthma, tuberculosis, helminthiasis, dyspepsia, diarrheas, neurasthenia, diabetes, cardiopathy, hyperthermia and general debility and as a nasal drop in headache10. It is a proven anti hypertensive11, 12, anti-tumor13, antioxidant14, Neuroprotective15and antidiarrhoeal16. It is one of the ingredients of a reputed ayurvedic preparation, Chyavanaprash17. The root of the plant reported to contain leucopelargonidin, flavonoids and proteins9, 18. As per our literature survey no experimental investigations have been carried out on the aphrodisiac properties of this plant. Hence, the aim of the present investigation was to evaluate the aphrodisiac potential of root extract of P. viscida on male rats.

MATERIAL AND METHODS

Collection and of identification of Pseudarthria viscida

The roots of Pseudarthria viscida (L.) Wight and Arnott were collected from Andhra Pradesh, India. The plant authentication was done by Director, Plant Anatomy Research Centre, India. The roots were washed with distilled water and stored at 37ºC for several weeks until dried. They were then ground and passed through 40-mesh sieve.

Preparation of extracts

The powdered roots of Pseudarthria viscida (5.0 kg) were extracted successively with 95% ethanol (10 L × 3). The combined ethanol extracts were filtered and concentrated by using a rotary evaporator and subjected to freeze drying in a lyophilizer till dry powder was obtained. The extract was suspended in 2%v/v aq. Tween 80 solution for evaluating the aphrodisiac activity19.

Experimental Animals and treatment regimen

Healthy, sexually mature Wistar male rats (200–220 g) and female rats (190–200 g) were obtained from the central animal house, Apex Medical University, Lusaka, Zambia. The animals were kept in cages, 2 per cage, with relative humidity (55%) in a 12 hour light/dark cycle at 25º±2ºC. They were given access to water and a commercial diet ad libitum. The experiment was approved by the Institutional Animal Ethics Committee.

Acute toxicity studies

Oral acute toxicity studies were carried out with male Wistar rats weighing 150-180g as per (OECD) draft guidelines 423 adopted on 17th December 2001 received from Committee for the purpose of Control and Supervision of Experiments on Animals (CPCSEA). The rats were fed with ethanolic extract of Pseudarthria viscida suspended in 2%v/v aq. Tween 80 solution at the dose of 2000mg/kg body weight. The animals were observed individually every 30 minutes after dosing the first 24hrs and thereafter daily for a total of 14 days. The animals did not show any mortality up to the dose level of 2000 mg/kg body weight in any of the groups and were considered as safe. Hence, 2000mg/kg body weight was considered as MTD (Maximum Tolerated Dose), one fifth of this dose (400mg/kg) was considered as the evaluation dose.

Protocol for aphrodisiac activity

Male rats (n = 5/group) were trained for sexual experience. To provide sexual experience, each male rat was allowed to stay with female rat for 30 min (used as mating stimulus) in behavioral estrous, several days before testing for copulatory performance in a transparent arena. The animals were tested 3 times over a 10-day period for copulatory behavior and divided into active and inactive groups20. Animals were dividing into following groups and the animals were treated as indicated below.

Groups	Treatment
Group I (Conl)	Saline 2ml
Group II (Active)	Ethanol extract of *Pseudarthria viscida* (400mg/kg, p.o)
Group III (Inactive)	Ethanolic extract of *Pseudarthria viscida* (400mg/kg, p.o)
Group IV (Active)	Penegra, sildenafil citrate (5mg/kg, p.o)

Female rats were ovariectamised using a standard procedure20. They were allowed to recover from the surgery for 10 days. They were brought into estrous by the administration of a single subcutaneous dose of 2µg/kg body wt. of estrogen benzoate (Sigma Chemical Co.,) and 500µg/kg body wt. progesterone (Sigma Chemical Co.,) 48 and 6 h before the copulatory study.

Sexual behavior study

The experiments were performed as per the standard guidelines21,22. Male rats were kept individually whereas females were kept in groups; training of each male for 15min at a time was performed until the onset of sexual behavior and when the behavior was noticed, males were exposed to receptive females (1 male: 5 female); the animals were exposed to repeated training to overcome the lack of sexual response in the presence of observers; the study was conducted in a single observation cage in a silent room under dim red light. Any jerking movement of the mating area was avoided to enable the rats to chase each other; and cleaning of the mating area was performed after each trial, since the urine and feces left by one rat might interfere with the sexual behavior of the other rat. They were fed commercially available food twice each day, and water was always made available. All sexual behavior tests were observed for 4 h and performed after the onset of dark. Ethanol extract of Pseudarthria viscida roots (400mg/kg body weight/day) and Penegra (sildenafil citrate) (5 mg/kg bodyweight/day) in 2% v/v aq.tween 80 solution were administered for 40 days orally by gavage. Penegra (Sildenafil citrate) served as standard. The control group received 1 ml of 2% v/v aq.tween 80 solutions. Each group consisted of six animals (one male and five females). The female was then introduced into the chamber and the following sexual behavior parameters were recorded: (a) mount latency (ML): the time interval between the introduction of the female and the first mount by the male; (b) intromission latency (IL): the interval from the time of introduction of the female to the first intromission by the male (characterized by pelvic thrusting and springing dismount); (c) ejaculation latency (EL): the time interval between the first intromission and ejaculation (characterized by longer, deeper pelvic thrusting and slow dismount followed by a

Table 1 Sexual behaviour study of ethanolic extract of *Pseudarthria viscid*

Group	Sexual behaviour parameters	Mean ± SEM				
		0 day	**10th day**	**20th day**	**30th day**	**40th day**
Control (Active)	ML	69.37±4.21	63.22±5.16	59.36±4.76	61.99±4.95	66.19±4.87
	IL	181.12±8.56	177.55±8.26	171.06±7.98	165.07±8.11	157.69±8.04
	EL	7.98±0.98	7.73±0.89	6.96±0.91	7.11±0.82	7.23±0.96
	MF	22.02±2.45	22.99±2.89	23.34±3.01	22.55±2.94	22.99±2.91
	IF	8.56±0.98	8.12±0.94	8.37±0.86	8.63±0.94	8.51±0.87
	EF	2.46±0.06	2.49±0.07	2.44±0.05	2.41±0.06	2.36±0.04
	PEI	8.36±0.71	8.24±0.63	8.11±0.51	7.99±0.59	8.08±0.61
EEPV 400mg/kg (Active)	ML	72.15±3.78	66.12±3.67	60.12±3.75	41.33±2.61**	34.56±2.01*
	IL	168.56±12.05	147.56±11.81	119.56±9.89	93.66±8.63*	67.89±6.06*
	EL	8.17±0.61	7.81±0.54	7.05±0.48	6.11±0.48*	4.27±0.51**
	MF	27.89±1.98	31.26±2.22	38.56±2.86*	46.56±2.82*	55.26±3.48*
	IF	15.16±1.93	15.97±1.91	17.56±1.84	18.06±1.71*	20.11±1.83*
	EF	2.77±0.47	3.08±0.51	3.68±0.49*	3.97±0.48*	4.15±0.46*
	PEI	8.26±0.51	7.91±0.49	7.11±0.52	5.46±0.39*	4.76±0.50*
EEPV 400mg/kg (Inactive)	ML	135.25±9.23	120.33±8.62	104.52±8.04	87.26±5.51*	64.52±3.75*
	IL	315.26±23.48	280.63±21.37	229.67±18.65	173.26±9.11*	136.49±5.24*
	EL	5.92±0.53	5.13±0.51	4.96±0.53*	4.21±0.42*	3.89±0.56*
	MF	16.59±1.48	18.59±1.72	22.78±1.83*	24.56±1.98*	26.09±2.11*
	IF	7.83±0.83	8.24±0.80	12.57±0.81*	13.96±0.93*	15.96±1.23*
	EF	2.43±0.39	2.96±0.42	3.27±0.51	4.15±0.51*	5.75±0.64*
	PEI	9.17±0.43	9.04±0.42	8.62±0.35	7.49±0.39*	5.63±0.29*
Sildenafil citrate 5mg/kg (Active)	ML	68.96±4.63	58.69±5.32	55.12±4.95	39.12±3.49*	28.16±3.09**
	IL	186.46±10.23	179.50±9.63	173.16±7.65	117.56±6.26*	83.02±5.64*
	EL	6.86±0.41	6.61±0.56	6.47±0.91*	5.91±0.82*	4.08±0.96*
	MF	22.38±2.31	23.21±2.56	23.86±2.91	27.05±2.74*	32.05±2.91*
	IF	7.99±1.36	8.26±1.32	8.76±1.14	9.78±0.91**	11.16±0.67*
	EF	2.37±0.12	2.39±0.27	2.68±0.76	3.31±0.41*	3.97±0.36*
	PEI	6.75±0.71	6.64±0.76	5.34±0.61*	4.94±0.50*	4.16±0.41*

P values : *<0.05, **<0.01; ML, mount latency; IL, intromission latency; EL, ejaculation latency; MF, mount frequency; IF, intromission frequency; EF, ejaculation frequency; PEI, post-ejaculatory interval.

period of inactivity); (d) mount frequency (MF): the number of mounts observed in 30 min; (e) intromission frequency (IF): the number of intromissions observed in 30 min; (f) ejaculation frequency (EF): the number of ejaculations observed in 30 min; (g) post-ejaculatory Interval (PEI): the time interval between ejaculation and the first intromission of the following series.

RESULTS AND DISCUSSION

The present study was carried out to determine the aphrodisiac activity in ethanol extract of Pseudarthria viscida (EEPV). Rats have been commonly used as models to test for such activity23. Sexual behaviour in male rats consists of three distinct phases: mount during which the animal assumes the copulatory position, but does not insert its copulatory organ (the penis) into the vagina followed by intromission during which the copulatory organ enters the vagina during a mount and ends with the ejaculation which is the forceful expulsion of semen24.

In the present study, mount latency (ML), intromission latency (IL), ejaculation latency (EL), mount frequency (MF), intromission frequency (IF), ejaculation frequency (EF) and post-ejaculatory interval (PEI) were used for the assessment of the sexual functions in the animal used after treatment with EEPV (400mg/kg) in comparison to the standard Sildenafil citrate (5mg/kg)25 as shown in Table 1. Treatment with EEPV at the dose of 400mg/kg reduced ML, IL, EL and PEI significantly ($p<0.05$) in both active and inactive male rats. EEPV (400mg/kg) also increased MF, IF and EF significantly ($p<0.05$) in both active and inactive male rats. All these effects were observed on the 30th and 40th days of the study. Previous studies have indicated that products with such a trend in response are normally due to improved dietary supplements and the general state of the subject26. Other studies showed that the number of intromission and ejaculation latency, depend more directly on the good activation phenomena in the central nervous system and ejaculatory activities on the endocrine balance within the subject27,28.

The PEI was significantly ($p<0.05$) altered in EEPV at the dose of 400mg/kg treated active rats (20th day), whereas Sildenafil citrate (5mg/kg) did not alter the parameter on the 20th day. The IL, MF and EF were significantly altered in EEPV at the dose of 400mg/kg treated inactive rats (20th day), whereas Sildenafil citrate at the dose of 5mg/kg did not alter these parameters on the 20th day. Generally sexual behaviours are enhanced by elevated testosterone levels. Drug induced changes in neurotransmitter levels or their action in the cells could also change sexual behaviour. In this connection it should be remembered that on Ethanomedical practices of this plant is also considered as a nervous stimulant29. Investigations are in progress to explore the possible mechanism of action and the active phytoconstituents responsible for this activity.

CONCLUSION

Our study suggested that the ethanol extract of root of Pseudarthria viscida is a safe drug without any known adverse effects and can be very useful in enhancing the male sexual activity and treating various sexual disorders like erectile failure, premature ejaculation, lack of sexual desire and ejaculatory incompetence. Hence, future study on this plant should be in isolation of active constituents which may show fertility enhancing activity. Once a molecule has been isolated which possess activity then its derivatives could be synthesized and QSAR studies can be conducted which gives optimized result for activity30.

REFERENCES:

1. Kothari P. common sexual problems, 3rd edition, UBS publishers, New Delhi, 2001; pp. 1-6, 155, 203, 204, 221.
2. World Health Organisation, Binnial Report, Prevention of infertility, edt. J.Khanna, Office of Publication, WHO, Geneva, 1992-93; 32-33:161-166.
3. Joe FM. Erectile Dysfunction: Sexual response in men. Arch. Sex. Behav. 1990;14: 33-39.
4. El-Taher TS, Matalka Z, Taha HA, Badwan AA. Ferula harmonis `zallouh' and enhancing erectile function in rats: Efficacy and toxicity study. Int. J. Impot. Res. 2001; 13: 247-251.
5. Gauthaman K, Adaikan PG, Prasad RNV. Aphrodisiac properties of Tribulus Terrestris extract (Protodioscin) in normal and castrated

rats. Life Sciences, 2002; 71: 1385–1396.

6. Carro-Juaˇıreza, M., Cervantesa, E., Cervantes-Meˇındeza, M.G., Rodry´ ˇıguez-Manzob, Aphrodisiac properties of Montanoa tomentosa aqueous crude extract in male rats. Pharmacology, Biochemistry and Behavior, 2004; 78: 129–134.
7. Ramachandran S, Sridhar Y, Kishore Gnana Sam S, Saravanan M, Thomas Leonard J, Anbalagan N, Sridhar SK. Aphrodisiac activity of Butea frondosa Koen. ex Roxb.extract in male rats. Phytomedicine 2004; 11:165–168.
8. Gamble G. Flora of Madras. Calcutta: Shree Saraswathy Press Ltd, 1935.
9. Deepa MA, Narmatha Bai V, Basker S. Antifungal properties of Pseudarthria viscid. Fitoterapia, 2004; 75:581-4.
10. Warrier PK, Nambiar VPK, Ramankutty C. Indian medicinal plants: a compendium of 500 species Madras: Orient Long Man Ltd, 1996; 366.
11. Hansen K, Nyman V, Smitt UM, Adsersen A, Gudisen L, Rajasekaran S, Pusphagadan P. J Ethnopharmacol, 1995;48:43.
12. Nair KV, Yoganarashiman SN, Gopakumar K, Shantha TR, Keshava Murthy KR. Ancient Sci Life, 1985;4:211.
13. Vijayabaskaran M, Sivakumar P, Sambathkuamr R, Perumal P, Sivakumar T, and Jayakar b. Antitumor and antioxidant activities of Pseudarthria viscida against Dalton's ascites lymphoma bearing swiss albino mice. Res J Pharm and Tech. 2008; 1(3): 225-229.
14. Gincy M Mathew and Sasikumar JM. Antioxidant activity of Pseudarthria viscida. Ind J Pharma Sci. 2007; 69(4): 581-582.
15. Hanish Singh JC, Alagarsamy V, Parthiban P, Selva kumar P and Narasimha Reddy Y. Neuroprotective effect of ethanolic extract of Pseudarthria viscida (L) Wight and Arn against β – amyloid (25-35) induced amnesia in mice. Indian Journal of Biochemistry and Biophysics, 2011; 48:197-201.
16. Vijayabaskaran M, Venkateswaramurthy N, Babu G and Khatale PN. Antidiarrhoeal activity of Pseudarthria viscida roots. Int J Pharm and Tech. 2010; 2(2): 307-313.
17. Jeena K. Jose, Girija Kuttan, Ramadasan Kuttan. Journal of Ethnopharmacology, 2001; 75: 65–69.
18. Prasad NBR, Nambisan PNK. J.Res. Indian Med. Yoga and Homeo. 1976; 11(3): 104.
19. Waynforth BH. Injection techniques. Experimental and surgical techniques in the rats, Academic Press, London, 1980; 3.
20. Bures J, Buresova O, Huston JP. Techniques and Basic Experiments for the Study of Brain and Behavior. Elsevier Science Publisher, Amsterdam, 1983; 117–121.
21. Hart BL, Wallach SJR, Melese-D'Hospital PY. Difference in responsiveness to testosterone of penile reflexes and copulatory behavior of male rats. Hormone and Behavior.1983; 7:274–283.
22. Islam,MW, Tariq M, Ageel AM, Al-Said MS, Al-Yahya AM. Effects of Salvia haematodes on sexual behaviour of male rats. Journal of Ethnopharmacology. 1990; 33:67–72.
23. Miegueu P, Mbongue FGY, Assongalem AE, Dzeufiet DPD, Dimo T, Kamtchouing P. Anabolic activity of alcoholic extract of Piper guineense in immature castrated rats Pharmacology online, 2007;1: 99-107
24. Yakubu MT, Akanji MA, Oladiji AT. Aphrodisiac potentials of the aqueous extract of Fadogia agrestis (Schweinf. Ex Hiern) stem in male albino rats. Asian J. Androl. 2005; 7(4): 399-404.
25. Yakubu MT, Akanji MA, Oladiji AT, Adesokan AA. Androgenic potentials of aqueous extract of Massularia acuminata (G. Don) Bullock ex Hoyl. stem in male Wistar rats. J. Ethnopharmacol. 2008; 118(3): 508-513.
26. Sandroni P. Aphrodisiacs past and present: A historical review. Clin. Auton. Res. 2001; 11: 303-307.
27. Ang HH, Chan KL, Gan EK, Yuen KH. Enhancement of Sexual Motivation in

Sexually Naive Male Mice by Eurycoma longifolia. Pharmaceut. Biol.1997; 35(2): 144-146.

28. Arletti R, Benelli A, Cavazzuti E, Scarpetta G, Bertolini A. Stimulating property of Turnera diffusa and Pfaffia paniculata extracts on the sexual behavior of male rats. Psychopharmacol.1999;143: 15-19

29. Suresh Kumar PK, Subramoniam A and Pushpangadan P: Aphrodisiae activity of Vanda tessella (ROXB.) HOOk. EXDON extract in male mice. Indian Journal of Pharmacology. 2000; 32:300-304.

1. 30. Wolf E. Burgers Medicinal Chemistry and Drug Discovery. 5th Edn, Wiley-Inter Science, Newyork. 1997.

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