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Research article

Aphrodisiac Activity of *Bombax Ceiba* Linn. Extract in Male Mice

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Abstract

In the present study, the aphrodisiac activity of *Bombax ceiba* Linn. (Bombacaceae) root extract was investigated. The extract (400 mg/kg body wt./day) was administered orally by gavage for 28 days to male mice. 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 behavior study at day 0, 7, 14, 21, and 28. The *Bombax ceiba* hydro-alcoholic root extract reduced significantly ML, IL, EL and PEI ($p < 0.05$). The extract increased significantly MF, IF and EF ($p < 0.05$). These effects were observed in sexually active and inactive male mice.

Keyword: Aphrodisiac activity, *Bombax ceiba,* Sexual behavior study.

Introduction

Aphrodisiacs are substances that stimulate/increase sexual desire and performance. There are numerous reports of aphrodisiac activity attributed to plants[1, 2, 3, 4, 5, 6, 7], isolated constituents[8] and synthetic compounds[9]. *Bombax ceiba* is reported to possess antihypertensive, antioxidant, anti-diabetic, aphrodisiac and uterine tonicity properties[10, 11]. *B. ceiba* is also claim to use in the treatment of diarrhea, dysentery, menorrhagia, styptic and for wounds[12]. These claims are based largely on subjective opinion

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rather than scientific observation. The present study was undertaken to investigate the aphrodisiac activity of *B. ceiba* root extract at doses of 400 mg/kg body wt. in male mice[18, 19].

Materials and Methods

Plant material and preparation of extracts

Roots of *Bombax ceiba* were collected from Govt. Vidharbha Institute of Science & Humanities localities, Amravati (Maharashtra). The plant was identified and authenticated by Dr. Vishal R. Marathe of Department of Botany, Shri Shivaji Science College, Amravati and dried in the shade at room temperature. Dried roots were powdered in grinder and powder material (100 g) was suspended in 1 liter mixture of ethanol: distilled water (70:30). The suspension was stirred at 40 °C for 24 h and heated at 50 °C for 2 h. The extract was filtered then and dried (2.4% w/w yield).

Animals

Adult Swiss albino mice (weight- 25 to 35 gm) of either sex were used for the study. The animals were fed with standard animal feed and water ad libitum. The animals were housed at a temperature of 25±1 ^{0}C with a reversed light dark cycle (light from 2300 h to 1100 h) and relative humidity of 45-55%. The study was performed as per the protocols and recommendation of the Institutional Animal Ethics Committee, Govt. College of Pharmacy, Amravati.

Male mice (n = 5/group) were trained for sexual experience. To provide sexual experience, each male mice was allowed 30 min exposure to a female mice (used as mating stimulus) in behavioral estrous, several days before testing for copulatory performance in a transparent arena. The animal were tested 3 times over a 10 day period for copulatory behavior and divided into active and inactive groups. Sexually active animals were divided into control (saline) and *Bombax ceiba* extract treated (400 mg/kg body wt.) groups. The animals that did not show any sexual interest during training were considered the inactive group that was administrated *Bombax ceiba* extract (400 mg/kg body wt.). Female mice were artificially brought into estrous by the administration of a single subcutaneous dose of 2 µg/kg body wt. of estrogen benzoate and 500 µg/kg body wt. progesterone 48 h and 6 h before the copulatory study[13, 20].

Sexual behavior study

The following guidelines were followed in the study: a) males were kept individually but females were kept in groups; b) training of each male for 15 min at a time was performed until sexual behavior was elicited and when the behavior was noticed, males were exposed to receptive females (1 male with 5

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females); c) repeated training to overcome the lack of sexual response in the presence of observers; d) the study was conducted in a silent room under dim red light; e) any jerking movement of the mating area was avoided to enable the mice to chase each other; and g) cleaning of the mating area was performed after each trial, since the urine trails left by one mice might alter the sexual behavior of the next mice[14,15].

Bombax ceiba (400 mg/kg body wt. /day) hydro-alcoholic roots extract in distilled water were administered for 28 days orally by gavages. The control groups received 1 ml saline. Each group consisted of six animals (1 male & 5 female).The following parameters of the copulatory behavior were recorded with help of video tracking media (I) Mount Latency (ML) – The time taken for the first mount following the introduction of females; (II) Intromission Latency (IL) – The time taken for first intromission following introduction of the female; (III) Ejaculation Latency (EL) – The time interval between first intromission and first ejaculation; (IV) Mount Frequency (MF) – Numbers of mounts observed in 30 min; (V) Intromission Frequency (IF) – Numbers of intromission observed in 30 min; (VI) Ejaculation Frequency (EF) - Numbers of ejaculations observed in 30 min; (VII) Post-Ejaculatory Interval (PEI) – The time between the occurrence of ejaculation and the resumption of sexual activity, as indicated by next intromission. The copulatory behavior study was conducted at 0, 7^{th}, 14^{th}, 21^{st} & 28^{th} days[16, 17].

Acute toxicity tests

To determine acute toxicity, if any, dose of 0, 0.5, 1.0 and 2 g/kg. (*p.o)* respectively of the ethanol: water (70:30) *Bombax ceiba* roots extract were given to 4 groups each containing 6 mice. The control mice received saline in an identical manner. The mice were observed continuously for 1hr for any gross behavioral changes & deaths, if any and intermittently for the next 6 hrs and then again at 24 hrs after dosing. The behavior parameters observed were convulsion, hyperactivity, sedation, grooming, loss of righting reflex & increased respiration[7, 21].

Statistical Analysis

All the results are expressed as the mean±S.E.M. The data were analyzed for statistical significance by one-way analysis of variance (ANOVA) followed by Tukey test using computerized Graph Pad Prism, version 4.03 software (Graph Pad Software Inc). Values of $p<0.05$ were considered statistically significant. ($*p<0.05$, $**p<0.01$, $***p<0.001$)

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Table 1. Sexual behavior study of *Bombax ceiba*

Sr. No.	Groups	Para	Mean ± SEM				
			0 day	**7th day**	**14th day**	**21st day**	**28th day**
1	Active (Control)	ML	270±2.12	275±2.48	260±2.19	285±4.02	265±4.56
		MF	31±0.91	28±0.91	35±1.29	25±1.29	33.5±1.19
		IL	333±2.38	338.75±3.25	301±2.61	370±3.85	310±4.56
		IF	10±0.91	9±0.91	12±.081	8±0.91	10±0.91
		EL	930±2.19	980±2.38	850±6.45	1020±4.56	850±6.45
		EF	1.5±0.09	1.2±0.09	1.8±0.18	1.2±0.12	1.6±0.09
		PEI	242.5±2.78	248±3.85	215±4.20	270±4.56	220±3.85
2	Active (*B. ceiba* 400mg/kg body wt.)	ML	268±3.65	258±2.19	247±3.36*	208±0.23***	157±2.38***
		MF	32±0.91	35±0.81	38±1.82*	45±1.22***	55±0.91***
		IL	330±2.19	322±1.82	310±2.61***	274±2.19***	202±2.73***
		IF	11±0.91	13±0.91	15±0.91*	18±0.91***	22±0.91***
		EL	900±4.56	850±1.82***	801±2.58***	770±4.20***	704±4.20***
		EF	1.4±0.09	1.6±0.04	1.7±0.09	1.9±0.09**	2.5±0.09***
		PEI	230±2.04	205±4.26**	185±4.02***	170±4.56***	151±3.85***
3	Inactive (*B .ceiba* 400mg/kg body wt.)	ML	325±2.38	315±6.24	299±2.73**	270±4.20***	199±4.56***
		MF	21±1.08	20.5±1.32	24±0.91	28±1.68**	40±0.81***
		IL	380±2.19	369±2.38	358±4.56***	308±2.97***	248±1.70***
		IF	4.75±1.10	6±0.91	7±0.91	10±0.91*	14±0.91***
		EL	1200±36.5	1120±8.41*	1005±4.41***	943±3.76***	898±1.82***
		EF	1.1±0.09	1.2±0.04	1.3±0.07	1.5±0.09*	1.9±0.09***
		PEI	325±21.89	280±5.94	249±2.08*	252±24.83***	178±1.82***

Significance level: *p < 0.05, **p < 0.01, ***p < 0.001. ML–Mount Latency, IL–Intromission Latency, EL–Ejaculation Latency, MF–Mount Frequency, IF–Intromission Frequency, EF–Ejaculation Frequency, and PEI–Post Ejaculatory Interval.

Discussion

The observation of the sexual behavior study shows that *Bombax ceiba* extract reduced ML, IL, EL and PEI significantly in both active and inactive male mice. *Bombax ceiba* extract also increased MF, IF and EF significantly in both active and inactive male mice. All these effects were observed from the 21st and 28th days of study.

Sexually active and inactive animals showed increased and improved sexual performance, when *Bombax ceiba* roots extract (400 mg/kg body wt.) was administered for a period of 21 to 28 days. *Bombax ceiba* roots extract (400 mg/kg body wt.) has comparative aphrodisiac activity hence present study confirmed the claims of *Bombax ceiba* as an aphrodisiac agent. In the present study, the hydro-alcoholic extract of this drug was found to be devoid of any general conspicuous short term toxicity. Long term toxicity studies as well as systemic toxicity, if any, remain to be studied. However, since this

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drug is used in ethnomedical practices without any recorded toxicity, this plant is likely to be a safe drug.

Generally sexual behaviors are enhanced by elevated testosterone levels. Drug induced changes in neurotransmitter levels or their action in the cells could also change sexual behavior. In this connection it should be remembered that on ethnomedical practices this herb is also considered as a nervous stimulant. Active investigations will help to explore the possible mechanisms of action. The brain area most associated with sexual behavior is the limbic system. Research with various animal and human models indicates a relationship between brain dopamine, 5HT (Serotonin) and sexual behavior[5]. Both dopamine and 5HT are implicated in depression. The relationship of dopamine to human sexual behavior is supported by reports of per-sexuality behavior induced by L-dopa in parkinsonian patients. Stimulants and antidepressants are known to affect libido, erection, ejaculation and orgasm. It is also suspected that monoamines play a crucial role in the regulation of sexual behavior, particularly that of dopaminergic transmission in the facilitation of masculine activity. Thus, both dopaminergic and adrenergic receptors are involved in sexual behavior[8, 22].

Conclusion

The present study confirmed the claims of *Bombax ceiba* roots as an aphrodisiac agent. Sexually active and inactive animals showed increased and improved sexual performance, when *Bombax ceiba* roots extract (400 mg/kg body wt.) was administered for a period of 21 to 28 days. *Bombax ceiba* roots as an aphrodisiac activity may be due to the following mechanism of action, Simply provides a burst of nutritional value, thereby improving the immediate health or well being of the consumer and consequently improving sexual performance and libido. May be due to the specific physiological effects on blood flow; mimic the burning of fire of sex and intercourse and increase the duration of sexual activity. May cross the blood brain barrier and mimic or stimulate some areas of sexual arousal.

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