

Pharmacological evaluation of *Vrishya karma* (Aphrodisiac activity) of Whole plant of *Lavandula bipinnata* (Roth) Kuntze

Research Article

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Abstract

Background: *Lavandula bipinnata* Roth. of family Lamiaceae known as *Kamaraja* in Odisha is an erect, strongly fragrant, annual herb with multifaceted ethno medicinal claims to treat, poisons, tooth ache, anxiety, depression, headache, cold and sexual disorder etc. **Aim:** To study the effect of whole plant of *Lavandula bipinnata* for its aphrodisiac activity in albino rats. **Material Methods:** The sexually active male rats were chosen separately and divided into 2 groups; each group consisting of 6 animals and the study was carried by using the suitable animal experimental model. The data generated during the study were analyzed by employing Student's 't' test for paired and unpaired data as applicable to determine significant difference between groups at $P < 0.05$. **Results:** *Lavandula bipinnata* showed significant increase in weight of rats in comparison with initial weight. Test drug provided significant increase in mounting frequency, licking, chasing, genital sniffing, in comparison to control group and non-significant increase in mounting latency and serum testosterone level. **Conclusion:** *Lavandula bipinnata* whole plant possess significant aphrodisiac activity in test rat model and confirms its traditional claim as an aphrodisiac.

Key Words: Aphrodisiac, *Kamaraja*, *Lavandula bipinnata* Roth., *Vrishya*.

Introduction

Aphrodisiacs are the substances which are used to increase sexual activity and help in fertility. The basic and fundamental purpose of sex and sexuality is the "continuation of progeny" and the survival of human race (1). Infertility and impotency are one of the major health issues now days in society and to deal with it is the need of the time (2). Many synthetic drugs are available and or used to treat the sexual problems. Being expensive and also their ability to provoke serious adverse effects are some of the drawback for these drugs. Hence, there is always a search of aphrodisiac drugs from plant origin. An ethno botanical information reports about potential of 200 plants as aphrodisiac (3).

Recent studies reports aphrodisiac study of certain drugs of Lamiaceae family such as *Clinopodium gilliesii* Benth.,(4) *Lavandula angustifolia* Linn.,(5) *Occimum basilicum* Linn.,(6) *Occimum gratissimum* Linn.,(7) *Pogostemon bengholensis* Burm.f.,(8) *Pogostemon cablin* Benth.,(9) *Pogostemon ouricularius* Linn.,(10) *Salvia fruticosa* Miller.,(11) *Salvia pelbeia* R.Br.,(12) *Satureja khuzestanica* Linn.,(13) *Scutellaria*

discolor Colebr.,(14) *Sideritis syriaca* Linn.,(15) *Vitex agnus-castus* Linn.,(16) etc.

Lavandula bipinnata Roth., of family Lamiaceae is an erect, strongly fragrant, annual herb preferably growing on rocky hill slopes. Commonly found in open areas especially hills surrounding the cities throughout India (17). Various parts like root, stem, leaf, fruit, flowers or whole plant, have been reported different disease conditions *L. bipinnata* reported for many pharmacological activity including analgesic, anticonvulsant, antidepressant, cholagogue, antispasmodic, digestive aid, antioxidant, anti-inflammatory, cancer chemo preventative, insecticide or aphrodisiac (18).

The present study has been planned to assess the aphrodisiac activity of its whole plant on Wistar albino rats.

Materials and Methods

Collection and authentication

The plant *Lavandula bipinnata* (Roth.) Kuntze was identified by studying the morphological characters of various parts and comparing them with various characters described in flora and books (19-21) and was collected by the scholar from one of its natural habitats, Paikmal, Ghandmardhan hill, Odisha, during the month of December 2019, with the help of local Vaidya and taxonomist. Herbarium sheet of sample were deposited to institute pharmacognosy museum (voucher specimen NO. Phm/6301/2019-20) for future reference.

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Animals

Wistar Albino rats of either sex weighing between 200±40 g were used for experimental study. The animals were obtained from the Animal house attached to the Pharmacology laboratory. Animals were exposed to the 12 hrs light and dark cycles with ideal laboratory condition in terms of ambient temperature (23±3) and relative humidity (50-60%). They were fed with standard rat pellet feed and drinking water given *ad libitum*. All the experimental protocols were carried out after obtaining permission from Institutional Animal Ethics Committee (IAEC/27/2020/16) as per guideline of CPCSEA, India.

Selection of male rats

The selected active male rats (weight between 200±40 g) were kept separately for 10 days prior to study. They were trained for sexual experience with normal estrus female rats in estrus cycle. Male rats were again allowed to acclimatize to the new atmosphere in the transparent cage, which was used as test area. It was of square structure made of fiberglass with opening at both upper and lower end.

Selection of female rats

Adult female rats of the weight between 200±40 g were selected for the study. They were kept in group in separate cages after marking. To select the rats for the copulatory study, their vaginal smears were taken prior to experimentation and only estrus female were used for the present study.

Test drugs

The whole plant powder was grounded into fine powder by mechanical grinder and sieved (mesh no.120#) and powder were kept in air tight glass jar for use in experimental study.

Dose fixation

Dose of the test drug was fixed by extrapolating the human dose to laboratory animals on the basis of body surface area ratio as per the table of Paget and Barnes (1964). (22) Human dose of *Lavandula bipinnata* whole plant powder- 3 g/day

- Rat dose = Therapeutic human dose X Body surface area ratio (convertibility factor) for rat
- = Human dose x 0.018 for rat weighing 200g
- = 3 g x 0.018 = 54 mg/200 gm rat = 270 mg/ kg body weight of rat/day

Route of administration

The test drug was administered according to the body weight of the animals by oral route with the help of oral cannula.

Experimental details

The selected male rats were divided into two groups randomly comprised of six animals each as follows.

- Group I: Normal control group, received distilled water (10 ml/kg, po)
- Group II: Whole plant of *Lavandula bipinnata* (Roth.) (Whole plant powder of *L. bipinnata*) (270 mg/kg, po)

The test drug and control was administered to respective groups for 30 consecutive days. On 30th day, one hour after test drug administration, sexual behaviour of each male rat was observed visually in the transparent area with selected female estrus rats.

First, vaginal smear of female rats were taken to assess the estrus stage. Only estrus female rats were selected for the experimentation. The estrus female rat was placed into the transparent cage with individual male rat for 30 minutes under dim light with green curtains on the window and complete silent environment. Duration of sexual activities was recorded (time in seconds) with aid to stop watch. The following parameters were noted for aphrodisiac activity of test drugs,

1. Initiation of latency of sexual behaviour i.e. grooming of genitals, sniffing, licking etc.
2. Mounting latency, mounting frequency.
3. Average duration of sexual activity.
4. Sex hormone analysis

All the treated and control group animals were observed individually with fresh receptive female rats. Any noise and jerking movement of the mating area was avoided. Sufficient space for the animals in the mating area was provided to be enable them to chase each other in dim light. Cleaning of the mating area was done after each trial.

Statistical analysis

Result are presented as Mean±SEM, difference between the group was statistically determined by Student's 't' test for paired and unpaired data for unpaired data to determine significant difference between group at p<0.05. The level of significance was noted and interpreted accordingly.

Observations and Results

Body weight

Table 1: Effect of *L. bipinnata* whole plant powder on body weight of albino rats

Group	Body weight (g)				
	Initial	7 th day	14 th day	21 st day	Final
Control	153.83± 2.33	159.00± 4.82	186.17± 5.76*	207.83± 7.46*	237.16± 10.55*
L. <i>bipinnata</i>	236.60± 5.92	257.66± 8.29**	271.17± 10.66*	282.67± 10.66**	290.66± 11.30*

Data: Mean± SEM

*P<0.01, **P<0.001 when compared to initial body weight (Paired 't' test)

The data related to the effect of test drug on body weight in albino rats has been represented in table 1. An apparent gain in body weight was observed in test drug group including normal control group when the values compared with their respective initial weights. Control group showed statistically significant increase from 14th day onwards and in test drug treated group i.e. *L. bipinnata* showed significant increase in weight gain

of rats from 7th days onwards compared with their respective initial weights.

Table 2: Effect of Effect of *L. bipinnata* whole plant powder on sexual behaviour activity of albino rats

Treatments	Sexual behaviour activity of rats on 30 th day			
	Licking (no.)	Chasing (no.)	Genital Sniff	Mounting frequency (no)
Control	8.66±1.92	5.66±1.35	7.00±1.29	0.33±0.21
<i>L. bipinnata</i>	20.00 ±1.98@	19.83 ±2.75@@	16.33 ±1.40@@	11.00 ±2.20*

Data: Mean± SEM

@ P<0.01, @@P<0.001, *P<0.001, when compared to control group (Unpaired ‘t’ test)

Data pertaining to the effect of *L. bipinnata* on sexual behaviour of male rats are summarized in table 2. *L. bipinnata* whole plant powder produced statistically significant increase in number of licking of female genital, chasing behind female rats, sniffing and mounting frequency like sexual behaviour activity in male rats in comparison to control group.

Table 3: Effect of *L. bipinnata* whole plant powder on serum testosterone level in albino rat

Treatments	Dose (per kg)	Serum testosterone (ng/ml)	% Change
Control	--	133.36±42.49	--
<i>L. bipinnata</i>	270 mg/kg	213.56±50.36	60.13 ↑

Data: MeanSEM; ↑ Increase

Table 3 shows the data related to the effect of test drugs on serum testosterone level in albino rats. The serum testosterone level was increased in rats treated with whole plant *L. bipinnata* powder in comparison to normal control group. Test drug produced effect in comparison to normal control group.

Dicussion

In India, indigenous remedies have been used in treatment of sexual dysfunction since the time of *Charaka* and *Sushruta*. An aphrodisiac is defined as an agent that arouses sexual desire. Sexual health and function are important determinants of quality of life. To overcome the problem of male sexual erectile dysfunction various Indian natural aphrodisiac plant potentials were preferred (23).

During the experimental study, in comparison to control group, there was significant increase (values) in body weight of albino rats in test drug group. *Lavandula bipinnata* possess phytochemicals i.e. alkaloids, carbohydrate, glycosides, saponin, phenol, tannin, gum and mucilage. Histochemicals result of *L. bipinnata* indicates presence of starch, protein, tannins, saponin, fats, alkaloids and glycosides (24). Among them some phytoconstituents carbohydrate and glycosides and fat are helpful in increasing body weight. These all factors can lead to weight gain in animal.

In mount frequency, *L. bipinnata* showed significant increase in comparison to control group.

Lamiaceae, also called as mint family, one of the largest families including herbs and shrubs often with aroma. Clinically not recorded an aphrodisiac activity in classical texts, *L. bipinnata* (Roth), contains different types of phyto-chemicals like Camphor, *Lavandulol*, *Linalyl acetate* and *Lavandulol acetate*. (25) Lavender essential oil derived from *L. bipinnata* is used in balm, perfumes, cosmetics and topical application. It is beneficial for anxiety, headaches depression and cold (26). Lavender is considered to be an aphrodisiac. The Lavender aroma and pumpkin dough caused the largest increase in blood flow to the penis (27). Camphor is used as an aphrodisiac to excite the reproductive organs, the effect of camphor on sexual performance might also be mediated via its effects on sympathetic nervous system, since an earlier report showed that camphor specifically inhibited catecholamine secretion by blocking nicotinic acetylcholine receptors (28). Libido is under psychosomatic, neurogenic, vascular and hormonal (primarily testosterone) controls (29).

In rest of the parameters the sexual behaviour i.e. licking, chasing and genital sniffing the drug treated group revealed significant effect when compared to control group. Tactile impulses enter the spinal cord from areas adjacent to the penis to aid in stimulating the sexual act. For instance, stimulation of the anal epithelium, the scrotum and perineal structures in general can send signals in to the cord that add to sexual sensation. Indeed one of the cause of sexual drive is filling of sexual organs with secretions. Appropriate physical stimuli can greatly enhance the ability of a person to perform the sexual act. Simply thinking sexual thought or even dreaming that the act of intercourse is being performed can initiate the male act, culminating in ejaculation. There are the factors related to male psyche which contribute to their sexual behaviour. These are attraction for women, war and defence territories etc (30). According to *Ayurveda*, the study was carried out in *shishir ritu* which comes under *aadaana kaala*, *hemant* and *shishir* are similar so the condition of *dahabala* in rats obviously to be high in amount and overall good *aagneya bhav* in *prakruti* and good libido and enjoy sexual intercourse up to full satisfaction at the advent of *shishir*(31). *Vrishya karma* would have caused the significant finding in test drug group.

In case of serum testosterone, non-significant increase in value was noted in case of *Lavandula bipinnata* (Roth) treated group but slightly increase the level of testosterone in comparison to control groups. The reproductive function of male can be divided into three major subdivision: spermatogenesis, performance of the male sexual act and regulation of male reproductive function by various hormones. Testosterone is also responsible for development of secondary sexual characteristics such as increase muscle and bone mass and the growth of body hairs. Anabolic effects exhibited by testosterone include growth of muscles and skeletal mass growth. Weight gain in control and vehicle control animal groups can be attributed to this (32). There are many references regarding fluctuation and huge variability in values of

serum testosterone of rats during their circadian rhythm, seasonal cycle as well as during complete life cycle.(33)

The data generated during this study reveals presence of high aphrodisiac activity in *L. bipinnata*. and significantly increase androgenic activity in this research work at this particular dose level, dosage form and in this particular experimental animal model.

Conclusion

L. bipinnata whole plant powder showed significant increase in weight gain of rats, mounting frequency, licking, chasing, genital sniffing, non-significant increase in mounting latency, serum testosterone in experimental animals.

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Competing Interest

Author have declared that no competing interest exist.

Abbreviations Used

SEM: standard error of mean, **ANOVA:** Analysis of variance, **SI:** Significant increase, **NSI:** Non significant increase.

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