

EVALUATION OF PHYSICOCHEMICAL STANDARDS OF VIPARIT LAJJALU (*BIOPHYTUMSENSITIVUM* LINN.) AND IT'S EFFECT ON SPERM AND QUALITY OF SPERM IN ADULT MALE WISTAR RAT

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ABSTRACT

The present study was undertaken to evaluate physicochemical standards of *viparit lajjalu* (*biophytumsensitivum* linn.) And its effect on sperm and quality of sperm in adult male wistar rat. In our daily activities, medicinal plants are widely used by traditional medical practitioners to treat various diseases. One of those used as traditional folk medicine is in various conditions such as stomach ache and burning sensation, inflammation, arthritis, wounds, gonorrhoea, amenorrhoea and dysmenorrhoea, asthma, cough, degenerative joint disease, urinary calculus, diabetes, snake bite, *viparitalajjalu* (*biophytumsensitivum* linn) of the family *oxalidaceae*. It has ethanobotanical articles that explain the aphrodisiac activity and sterility activity of the same plant. Due to different opinions on the activity on sperm of *b. Sensitivum* linn, the proper scientific study should be done for an accurate conclusion of the effect on sperm. Thus, there is a requirement to study the effect of *b. Sensitivum* linn. And as positive control *erandamoola*(the root of *ricinuscommunis* linn.) On quantity and quality of sperms serum testosterone, serum fsh, lh, prolactin levels and testicular cells in adult male wistar rat. Reference standard randomized animal experimental study of 18 (3x 6 group) adult male wistar rats will be done as an animal model. The adult male wistar rats will be kept under observation for 4 to 5 days in a normal diet and environment before the intervention. Evaluation of physicochemical standards of *viparitalajjalu* (*biophytumsensitivum*linn.) And its effect on sperm and quality of sperm in adult male wistar rat. according to the observation and results, an appropriate discussion and conclusion will be formulated.

KEYWORDS: *ViparitLajjalu*, *Erandamoola*, Male wistar rats, Aphrodisiac , Sterility activity

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INTRODUCTION

In the traditional Ayurveda system of medicine in India, *Biophytumsensitivum* (Linn.) DC is a significant medicinal plant. It belongs to the *Oxalidaceae* family and is distributed in tropical Asia, Africa, America, and the Philippines. Nine species of *Biophytum* are predominant in India; of those three species, viz. Ethnomedicinal properties have been identified in *Biophytumsensitivum* (Linn.), *Biophytumreinwardtii* (Edgew), and *Biophytumumbraculum* (Welw.) 1. *Viparitalajjalu*, *Jalapushpa*, *Krichhrraha*, *Laghuvrishaka*, *Panktipatra*, and *Peethapushpa* in Sanscrit are the vernacular names of the plant; *Mukkutti*, *Nilaccurunki*, and *Tintanali* in Malayalam, *Lakshmana* and *Lajjalu* in Hindi, and *Nilaccurunki*, and *Tamil*, *Teendanaazhi*.⁽¹⁻⁴⁾ In response to touch, it is known for its interesting characteristic - inward curling of leaves and therefore the name is '*Lajjalu*'. 4 The *B. sensitivum* is a mesophytic under-shrub, commonly known as 'Life Herb' or 'Sensitive Plant'. This 'little tree plant' develops to a height of 2.5 to 25 cm as an unbranched woody erect stem. The plant's leaves are abruptly pinnate, sensitive, 3.8-12.7 cm long, and consist of 8-17 leaflet pairs. On the top of

the stem, the leaves grow and are crowded into a rosette. 2,3,5 The leaflets are opposite, about 1 cm long; the largest is terminal pairs. The flowers are dimorphic and yellow and are clustered at the apices of the peduncles, reaching a maximum diameter of 8 mm. The sepals are lanceolate, nerve-like, 7 mm long, and parallel. The Corolla reaches the sepals by even more. It's almost glabrous in style.⁽⁴⁾ The fruit is an ellipsoid-apiculate capsule. This plant's seeds are ovoid, prominently ridged, and striated transversely. From September to December, the *B.Sensitivum* produces flowers and fruits. 6*B. sensitivum* is rich in a variety of chemicals, including phenolics and polyphenols, saponins, tannins, essential oils, polysaccharides, and pectin.^(1,4,7-10) The existence of the two key bioactive principles, bioflavonoids like cupressoflavone and amentoflavone, has been documented by Mhaske and Gonjari.⁽¹⁰⁾ The presence of alkaloids, carbohydrates, flavonoids, proteins, cardiac glycosides, oils, phenolic compounds, terpenoids, and tannins in *B.Sensitivum* alcoholic extracts were suggested by the phytochemical study.⁽¹¹⁾ One of the beneficial herbs that make up the '*Dasapushpam*' community, an Ayurvedic formulation, is *B.Sensitivum*.⁽¹²⁾ The

whole plant (*samoolam*) *B.Sensitivum* is used for the treatment of different illnesses in Ayurveda. The warehouse The analgesic, antipyretic, anti-inflammatory, immunomodulatory, antitumor, antidiabetic, hypocholesterolemic, antioxidant, antibacterial, antifungal, antihypertensive, chemoprotective, radioprotective, antifertility, and wound healing properties have a multitude of therapeutic potential.⁽¹³⁻²²⁾ Other than this *B.Sensitivum* Linn. has some other activities. As *Putrajanani* means capacity to generate healthy off spring in *Bhavaprakash* about *Laxmana*.

In *Bhavprakash*, *ViparitLajjalu* (*Biophytumsensitivum*) is one medication in the group of *Laxmana*.⁽²³⁾ Acharya *Sushruta* has also been identified by *Laxmanamula Strivandhyatvanashana* and *Vandhyatva* in *Shushrutasamhita*, which improves the quality, quantity, and abnormality of the female reproductive system.⁽²⁴⁾ *B.Sensitivum* Linn. all over India has been openly used. It is also used for aphrodisiac operation, wound healing, and malaria in folklore in the West African and Malian regions.⁽²⁵⁾ To induce sterility in man, the entire plant is also consumed.⁽²⁶⁾ Due to various opinions on the sperm activity of *B.Sensitivum* Linn, for a reliable conclusion of the effect on sperm, a proper scientific analysis should be carried out.

Background/rationale

A few days now folklore herbal remedies are getting more attention. For research and creation, folklore medicines are a more relevant source of information. From older healing techniques, there is potential to promote new ideas, ways, and treatment modalities. Infertility becoming the burning issue day by day and male infertility factors contribute to approximately 30% of all infertility cases because tobacco chewing, chronic alcoholism, and standard treatments are expensive. It is not affordable for general people. After critical review, no preclinical and clinical work has been done previously and the conclusions of existing studies are contradictory to each other in therapeutic uses. To generate the evidence regarding specific action *b.sensitivum*, it is necessary to overcome the confusion about the activity of *b.sensitivum* linn on sperm in a scientific manner. Ayurveda treatment having minimal side effects and economically viable. If the drug will be proved to be spermatogenic then it can be used for male infertility at an economic cost.

Erandamoola (the root of *Ricinuscommunis* Linn.) is also known as spermatogenic activity mentioned in Charaka Samhita in *Agreysangrahaas Vrushya*, and its work has been proved in Preclinical study. So that can make it positive control for the study. Several related studies were reported.⁽²⁴⁻²⁶⁾ Kakde et. al. assessed the Effect of Varicoceleotomy on Parameters of Semen Analysis of Infertile Men.⁽²⁷⁾ of the related studies were reviewed.⁽²⁸⁻³¹⁾

Research Gaps Analysis

After reviewing the scientific articles about *B.Sensitivum* Linn. two different opinions are found. Tom Erik Grønhaug et. al. suggests that *B.Sensitivum* Linn. is having sterility activity. However, Padhye et.al. suggests aphrodisiac activity, *B.sensitivum* Linn. Till now, the original study

exploring the fact about aphrodisiac or sterility activity of *B.Sensitivum* Linn. is not evident. Hence, with this study, the exploration of the fact of *B.Sensitivum* Linn. can be done.

AIM AND OBJECTIVES

Comparative Evaluation of the effect of *ViparitLajjalu* (*B.sensitivum* Linn.) and *Erandamoola* (the root of *Ricinuscommunis* Linn.) on quality and quantity of sperms in adult Male Wistar rat.

1. To study the effect of *B. sensitivum*Linn.on quantity & quality of sperms serum testosterone, serum FSH, LH, Prolactin levels & testicular cells in adult male wistar rat.
2. To study the effect of *Erandamoola* (the root of *Ricinuscommunis* Linn.) on quantity & quality of sperms, serum testosterone, serum FSH, LH, Prolactin levels & testicular cells in Adult Male Wistar Rat.
3. To study Physico-chemical parameters and phytochemical constituent of *B.Sensitivum* Linn. (*ViparitLajjalu*) collected from different regions of India.

MATERIAL AND METHODS

Source of Data

Animal experimentation in adult male wistar rats.

Type of Study

Reference Standard Randomized Animal experimental study.

Study design

Reference Standard Randomized Animal experimental study.

Drug collection/ authentication

Table should be complete

The field sample of *ViparitLajjalu* (*Biophytumsensitivum* Linn.) will be collected from four regions (North, south, east & west) of India in August – September *Varsha* and *Sharad* Ritu.

Identification &Authentication of drugs

The plant material will be authenticated and identified from FRLHT Bangalore.

Table 1: Detail of Drug Preparation

B.Sensitivum Linn will be cleaned and washed under tap water, then dried in shade and coarsely powdered. Coarse powder of *B.Sensitivum* Linn (1part) + distilled water (8parts) will be taken in a wide mouth steel vessel. The above mixture will be heated till the total content reduces up to 1/4th quantity.²⁷ The above *Kwath* will be filtered and stored till use. The preparation will be standardized as per API in the analytical lab of Mahatma Gandhi Ayurvedic Medical College, Sawangi (Meghe), Wardha. It will be prepared daily and administered to the Rat.

Sampling procedure

All male albino wistar rats will be randomly divided into three groups.

Sample size (Including sample size calculation)

18 (3x 8 group) adult male Wistar rats will be used as an animal model. All animal experiments will be carried out in

accordance with the guidelines of CPCSEA. After the approval of the institute animal ethical committee.

Group	Sample size	Intervention	Dose and Frequency	Duration	Follow-up
I-Control group	08	Distilled Water	0.9 ml (25 gm/kg/ body weight) orally OD	55 days	FNAC of rat on 56 th day
II-Positive Control	08	Decoction (Kwath) of root of <i>Erandamoola</i> (root of <i>Ricinus communis</i> Linn.)	0.9 ml (25 gm/kg/ body weight) orally OD	55 days	FNAC of rat on 56 th day
III-Experimental group	08	Decoction (Kwath) of root of plant of <i>VipariLajjalu</i> (root of <i>Biophytumsensitivum</i> Linn.)	0.9 ml (25 gm/kg/ body weight) orally OD	55 days	FNAC of rat on 56 th day

Conversion formula

Human Dose = 20gms – 30gms of drug for Kwath as per API.
Total clinical dose (Human dose) x conversion factor (0.018) per 200 gm of rat
Dose calculation for 25gm of human dose (Minimum dose) = 50 ml for decoction =
50 x 0.018 = 0.9ml of decoction/day orally

Inclusion criteria

Age of minimum 6 months old and weight of minimum 250 gms to 350 gms, Male Wistar rat without any diseases.

Exclusion criteria

Young, diseased, who are under other study.

Assessment Criteria

Investigation and drug analysis will be the assessment criteria.

Investigations

A. Sperm analysis

1. Sperm count.
2. Sperm morphology.
3. Sperm motility.

B. Biochemical investigations

1. Serum testosterone.
2. Serum FSH.
3. Serum LH.
4. Prolactin levels.

C. Histopathological investigations.

1. Testicular biopsy.

D. FNAC (fine needle aspiration cytology)/ Sacrifice of Animal

The aspiration of the semen from the Epididymis of the rat will be done. If FNAC cannot be possible then only animals will on the 56th day; testis and Epididymis will be excised and examined.

Outcome measures

The adult Male Wistar rat will be kept under observation for 4 to 5 days in normal diet and environment before the intervention.

Bodyweight: Bodyweight will be observed before & during intervention weekly.

Food intake: Food intake increases or decreases during the intervention that will be observed weekly.

Behavioural changes: Change in the behaviour like mood swings, activity will be observed.

Parameters for assessment: Sperm analysis, Biochemical investigations before and after the intervention will be observed. FNAC or Histopathological study of testes will be done after Intervention.

Statistical methods

The Data will be expressed as mean \pm SEM. Statistical analysis will be carried out by applying Paired t-test & one-way ANOVA test. Results will be analysed at a 5% level of significance.

Experimental animals

Age of minimum 6 months old and weight of minimum 250 gms to 350 gms, Male Wistar rat without any diseases will be taken for experiments.

Interpretation/ scientific implications

The outcome of the study will establish the fact about sterility or aphrodisiac activity of the *B.Sensitivum* Linn. which will open new avenues in the arena of research, regard to its use for infertility or can be used for contraception.

Expected Discussion and Conclusion

According to the observation and results appropriate discussion and conclusion will be formulated.

ETHICAL CLEARANCE

Taken from institutional ethics committee

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