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REVIEW ARTICLE ON VIEW ON *BRYONIA LACINIOSA (SHIVLINGI BEEJ)*

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ABSTRACT

Bryonia laciniosa is one such plant that is also known by the name of shivlingi as its seeds resemble the 'shivling' icon of Lord Shiva. This plant is mainly known for its seeds and is used in various ayurvedic drug formulations as an important ingredient. In Ayurveda and the folklore culture, shivlingi plant is used to treat various types of diseases such as cholera, bronchitis, constipation, diabetes, inflammation, paralysis, snake bites, abdominal diseases and mainly used as an aphrodisiac agent. In homeopathy, the B. laciniosa plant is used as an important ingredient in the formulation of anti-inflammatory drugs. Also, the plant is used to treat gastrointestinal, rheumatic, respiratory, liver, infectious diseases and metabolic disorders Besides this, shivlingi plant is associated with therapeutic potential which includes analgesic, antidiabetic, antioxidant, androgenic, antitumor, fertility and antipyretic properties. In this review article, the reported pharmacological properties of the plant have been described along with the plant utilization in folklore and ayurvedic medicinal system. Infertility varies across the regions of the world and it has been estimated to affect 8 to 12% couples worldwide. *Bryonia laciniosa* Linn commonly called as shivlingi is a medicinal plant belongs to the family Cucurbitaceae. It is a uterine tonic and improves the chances of conception in women suffering from infertility. Main chemical constituent is ‘Bryonin’ and it is folk medicine, its traditional uses are also reported like adenopathy, ague, asthma, bronchitis, carbuncles, cholera, colic, consumption, convulsions, cough, delirium, fertility, headache, megalospleny, paralysis, phthisis, snake bite. Its pharmacological proven as antidiabetic, anti-inflammatory, for obesity and specially for treatment of infertility. According to literature it is fertility enhancer herb used in ayurveda along with Putrajeevak Beej.

KEYWORDS: Shivlingi; Oligozoospermia; *Staphylococcus Aureus*; Serotonin Ayurveda, Folk view, Pharmacological properties.

INTRODUCTION

India is one of the richest countries as regards to the resources and availability of the medicinal plants. From time immemorial, we have been depending upon the forests for food, shelter, clothing, ornamentation, religious beliefs and most important is for health care. Tribals mostly reside in the forest areas and hilly terrains and they rely on these medicinal plants because of their effectiveness. More than 2500 species of plants have been recognized that have medicinal values. While more than 6000 plants have been recognized for having herbal usage. More than 50,000 plants have been identified and used for medicinal purposes throughout the world. Tribal communities have diverse knowledge of traditional medicines related to indigenous plants for basic healthcare needs.[1-3]

During past few decades, modern synthetic medicines have come into prominence with miraculous and instantaneous results. However, these are not providing adequate relief to common people of the developing countries due to their soaring prices and complicated side effects. Due to this, it is a worldwide realization today that the use of natural products as medicines is advantageous over synthetic ones. Extracts of some plants even in crude form are known to exert remarkable effects over biological systems. Such effects are due to certain chemical constituents present in plants and are commonly known as "active principle.'' Systematic phytochemical investigations of some medicinal plants have led to the isolation and characterization of some of the active principles and are widely used as potent drugs.[4] *Bryonia laciniosa* Linn commonly called as shivlingi is a medicinal plant belongs to the family Cucurbitaceae Shivlingi Seeds are used for the treatment of female infertility. It is a uterine tonic and improves the chances of conception in women suffering from infertility. It is fertility enhancer herb used in ayurveda along with Putrajeevak Beej. However, it has different ayurvedic properties and based on these properties, it reduces Kapha Dosha. Therefore, Shivlingi is more beneficial if the patient has more symptoms of increased or aggravated Kapha. It is not suitable if the patient has aggravated or increased Pitta Dosha.[5] From time immemorial the phenomenon of infertility was prevalent throughout the world which may persist as long as the human race exists. Every human being has an inherent, intense desire to continue one's own race. Infertility varies across the regions of the world and it has been estimated to affect 8-12% couples worldwide. The WHO has estimated the

overall prevalence of primary infertility in India to be between 3.9 and 16.8%. In the event of infertility, couples turn to the traditional medicine which is being used over the centuries for succor as Ayurveda holds high esteem and trust in this field.[6] It is seen from the literature that *Bryonia lacinosa* is a very important plant for its large number of medicinal properties as well as medicinally important chemicals like Glucomannan, Goniothalamin, Arabinoglucomannan. The plant shows many pharmacological activities like analgesic, antipyretic, anti-convulsant, antimicrobial, cytotoxic, antiasthmatic, anti-inflammatory and antifertility. Many traditional uses are also reported like adenopathy, ague, asthma, bronchitis, carbuncles, cholera, colic, consumption, convulsions, cough, delirium, fertility, headache, megalospleny, paralysis, phthisis, snake bite which are being studied till today and further research has to be done. Thus, *Bryonia lacinosa* is quite promising as a multipurpose medicinal agent so further clinical trials should be performed to prove its efficacy.[7,8]

Collection of plant material and extraction

The seeds were separated from the fruits and washed with large quantity of water. The seeds were grinded mechanically to make powder. The powdered sample was extracted with ethanol by Soxhlet to give *B. laciniosa* ethanol extract (BLEE). Total saponins were prepared by the method described previously.[4] The alcohol extract was concentrated, suspended in distilled water, and then partitioned successively with *n*-butanol saturated with water. The *n*-butanol extract was combined and evaporated using a rotary evaporator at 60°C to yield *B. laciniosa* saponin fraction (BLSF).

Morphology of plant part *Bryonia laciniosa*

Vernacular names of B. laciniosa plant

Gujarat	Shiva lingani
Benga	Shiva lingani
Hindi	Gargumaru, Ishwara lingi, shivalingi
Malayalam	Neohmaka
Marathi	Shivlingi, Vaduballi
Sanskrit	Pastambhini, Bakapushpha, Shiva Mallika
Telugu	Lingadanda
English	Indian bryony, Lollipop climber
Kannada	Linga tondeballi, Lingatonde balli, Lingatonde, Shivalinga
Tamil	Iyaveli/Iyvirali
Siddha	Iyaveli, iyaviraali
Nepal	Ghurmi iahara, Ghuru

Taxonomical classification of B. laciniosa

Taxonomical Rank	Taxon
Kingdom	Plantae
Sub kingdom	Tracheobionta
Superdivision	Spermatophyta
Class	Magnoliopsida
Subclass	Dilleniidae
Order	Violales
Family	Cucurbitaceae
Genus	Bryonia L.
Species	Bryonia laciniosa Linn.

Geographical Distribution

The plant is distributed in countries like Nepal, Pakistan, Thailand, South Japan, Sri Lanka, Philippines, Indonesia, Tropical Africa, Australia, Bhutan, China and Philippine islands. In India, it is found in the states of Bihar, Jharkhand, Andhra Pradesh, Goa, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Chhattisgarh, Maharashtra, Manipur, Rajasthan, Tamil Nadu, Tripura and Uttar Pradesh.

Phytochemical constituents of B. laciniosa

The main chemical constituent present in the plant is Bryonin. The seeds of the plant contain saponin molecules, flavonoids, phenolic acids, sugars, punicic acid, goniothalamin and gluccomannan 13. The polysaccharides and fatty acids were isolated from the pulp part of the plant 14. These polysaccharides include d-glucose, d-mannose and L-arabinose in the ratio of 5:3:4. However, detailed studies on the phytochemical screening of the plant is not reported yet. Figure no. 2 represents the phytochemical structures of B. laciniosa plant.

ACTIONS AND PROPERTIES

Shivlingibeej Indications

a) **Kaphashamak:** It alleviates the aggravated Kapha dosha. It also reduces the blockage of several channels in the body by clearing the excess Kapha and Ama.

Pittavardhak: It increases Pitta dosha. Vranshodhan: It is associated with wound healing property. Shothahara: It is used as an anti-inflammatory agent.

Madhumeh: It is used to treat diabetes and act as an antidiabetic agent.

Medahar: It is associated with an anti-obesity property. Swaskashara: It is used to treat asthma. Garbhdharan: The seeds of the plant are used to promote conceiving.

Jwarghna: It acts as an antipyretic agent.

Alpaartab: It is used to treat oligomenorrhea and regulates the menstrual cycle.

Kashtaartab: It is used to cure dysmenorrhea.

Vajjikaran: It acts as an aphrodisiac agent.

Garbhashyashothahara: It is used to treat oligospermia.

b) **Folk view:** In folklore, B. laciniosa plant is used to cure liver, gastrointestinal, rheumatic, respiratory, metabolic and infectious disorders18,19. In homeopathy, the plant is used as a significant ingredient in the formulation of antiinflammatory drugs. In India, the seeds of the plant are used to promote conception in women. The roots of the plant in combination with the roots of Michelia champaca are used to cure asthma and promote conception. Also, the plant parts are used against snake bites. In the folklore system, the leaves of the plant are used to cure bronchitis, carbuncles, colic, cholera, cough, convulsions, delirium, fertility, snake bites and paralysis. In India, the flowers of B. laciniosa are offered to Lord Shiva as the floral morphology of the plant is same as the deity of the lord called Shivalinga 20. c).

c) **Modern View:** As per WHO, herbal medicines are defined as plant-derived drugs or formulations which contain raw or processed ingredients from one or more plants. The consumption or utilization of herbal drugs has increased against the mice model at a dosage of 50,100 and 200 mg/kg in a dose-dependent manner. The extract showed maximum inhibitory effect (52.4%) at a dosage of 200 mg/kg after 3 hr. of drug treatment in the animal model while the standard drug showed 62.1% of inhibition. In the case of dextraninduced paw oedema, the chloroform extract exhibits significant inhibition (34.4, 43.2, 52.1%) in a dosedependent manner as compared to the control group. In histamine

and serotonin-induced paw oedema, 54.9 and 52.3% of inhibition was exhibited by the chloroform extract at a dosage of 200 mg/kg whereas 59.8 and 59.5% of inhibition were shown by indomethacin. In the cotton pelletinduced granuloma (chronic model), the decreased rate of granuloma tissue was exhibited by CEBL (chloroform extract of B. laciniosa) (200 mg/kg) at 50.1 and 57.3% respectively. The inhibition of peritoneal leukocyte migration at a dosage of 50, 100 and 200 mg/kg was also inhibited by CEBL.

Female Infertility

Diminished ovarian reserve (DOR) is a condition thatcauses infertility, mostly in older women. *Aartava-kshaya*, which can be correlated with DOR, has been described asdeficiency or loss of *Artavadosha* not appearing in time, isdelayed, or is scanty. DOR can occur in any conditionaccording to Ayurvedic types of *Vandhyatva* (inherentinfertility). Shivlingi Beej promotes fertility and increasesthe chances of getting pregnant. It also helps to normalizethe menstrual cycle if the patient has light periods with alittle blood flow. But if the patient has heavy blood flow during menstruation, then Shivlingi is contraindicated.

According to ayurvedic analysis, it is more beneficial ifthe patient is obese or overweight and has absent menses, light menstruation, having a feeling of heaviness in the lower abdomen and feeling of puffiness or swelling during the premenstrual and menstrual period. It is also beneficialif a woman with infertility suffering from depression along with a feeling of sadness and laziness, emotional eating, leucorrhea, increased sleep and swelling in legs or whole body. If the patient has thick mucus during her period or yeast infection, then it is also most suitable. In such cases, Shivlingi should be used in maximum dosage. Rasayan action of Shivlingi helps to synthesize purest Rasa dhatu subsequently, Upadhatu Artava is formed having required quality for fertilization. Hypothetically the Rasayan karma in this regard may act through androgenic effect via DHEA.[20]

Androgenic: The ethanolic extract of B. laciniosa seeds was examined for the androgenic activity against the male albino rat model. The groups of male albino rats were orally administered with the plant extract at a dosage of 50, 100 and 150 mg/kg body weight per day for 28 days. Results showed an increase in body weight, prostate, seminal vesicle, epididymis and weight of testis. A significant increase in sperm count, fructose level, serum testosterone, luteinizing hormone levels and spermatogenesis was also observed. Thus showed androgenic activity 20.

Antipyretic: The methanolic extract of the plant was evaluated for the antipyretic activity against standard animal model by evaluating normal body temperature and yeast-induced hyperpyrexia. Results showed a significant decrease in the body temperature up to 4 hours after the administration of the extract. Thus showed antipyretic activity10.

Antidiabetic: The ethanolic extract and the saponin fraction of the B. laciniosa seeds were evaluated for the antidiabetic activity in neonatally streptozotocin-induced diabetic rats for 10 weeks. Results showed a significant reduction in the glucose level, cholesterol, triglycerides, low-density lipoprotein, high-density lipoprotein, serum creatinine, serum urea and decline in the aspartate transaminase and alanine transaminase activities was also observed. Also, a significant increase in catalase, superoxide and levels of glutathione was noticed in n-STZ diabetic rats 30.

Anti-asthmatic: The alcoholic extract of the plant was evaluated for the anti-asthmatic activity by mesenteric mast cell count by the Atopic allergy method in rats. The number of intact and disrupted mast cells, in ten randomly selected fields for each tissue, was counted. Results showed an increase in granulation percentage in B. laciniosa treated samples compared to the control group of samples 31.

Antioxidant: The chloroform extract of the B. laciniosa fruits was examined to evaluate in vitro antioxidant activity using DPPH (1.1-diphenyl-2-picryl-hydrazil, ABTS, hydrogen peroxide and FRAP assay 32. Results showed a degree of reduction of absorbance which was recorded using UV-Vis spectrophotometer at 517 nm where ascorbic acid (AA), 95% ethanol and DPPH solution were used as standard and control samples respectively 33.

Antitumor: The experimental study was conducted in a mice model to evaluate the antitumor activity of the methanolic extract of the plant. The extract was administered in the mice model for 14 days after 24 h of tumor inoculation in a dosage of 62.5, 125 and 250 mg/kg. Results showed a significant decrease in the tumor volume and viable cell count thereby increasing the life span of EAC bearing mice. The increase in the levels of glutathione (GSH), superoxide dismutase (SOD), catalase and decrease in the level of lipid peroxidation was also observed 34.

Toxicity: The hexane extract of B. laciniosa plant was studied for the cytotoxicity at different dosages i.e. 62.5 µg/ml, 125 µg/ml, 250 µg/ml, 500 µg/ml, and 1000 µg/ml in MCF-7 cell

line using MTT (3-(4,5-dimethylythiazol-2-yl)-2, 5-diphenyl-2H-tetrazolium hydrobromide) assay. It was observed that the hexane extract of the plant showed cytotoxicity in a dose-dependent manner and increases with increased concentrations. The maximum cytotoxicity evaluated was 75.25 ±2.4 % at 1000 0 µg/mL concentration with an IC50 value of 453.33 ±1.6 µg/ml 35.

CONCLUSION

From the literature study, it was found that shivlingi plant is of great medicinal importance. It is considered an excellent remedy for infertility treatment. Mainly the seeds of the plant are utilized for the medicinal purpose. In the ayurvedic and folklore medicinal system, the seeds of the B. laciniosa plant are used to treat various ailments such as male and female infertility, obesity, weight loss, diabetes, inflammation, constipation and abdominal diseases. From the reported studies, it was found that the plant is associated with various therapeutic and pharmacological properties such as antidiabetic, androgenic, anti-asthmatic, antipyretic, antibacterial and antimicrobial activities. However, the plant is not explored much for its phytochemical constituents and therapeutic properties. So, the plant needs more attention from researchers and scientists for more experimental studies and clinical research to identify its pharmacological properties which will be beneficial in the development of important therapeutic drugs.

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