

# Bryonia laciniosa: A Ethnopharmacological Approach of Ayurvedic Shivlingi

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## ABSTRACT

*Bryonia laciniosa* Linn., also known as *Bryonopsis laciniosa* which is traditionally called to be Shivlingi, because the upper surface of the seeds looks like a "Shivling," a popularly worshipped Hindu divinity which is Lord Shiva. It is a medicinal plant belonging to the family Cucurbitaceae. It is used to uterine tonic and boost in mental function in reducing stressed women infertility. Its main chemical component is bryonin, which is linked with lymphadenopathy, fever, asthma, bronchitis, epilepsy, cholera, colic, consumption, convulsions, cough, delirium, infertility, headache, splenomegaly, paralysis, pulmonary tuberculosis, snakebite. It has been pharmacologically proven as an anti-diabetic, anti-inflammatory, weight problem, and primarily as a treatment for infertility. All men or women have an innate, passionate desire to preserve their race. Becoming a mother is one of every woman's greatest love dreams. Herbal medicines are much cheaper and less difficult to obtain and have no known ill effects. Many herbs that promote infertility are also used in folk remedies that are mostly undiscovered. It is a little-known conventional drug that has been proven to be effective in treatment.

**Keywords:** *Bryonopsis laciniosa*, *Bryonia laciniosa*, Pharmacological properties, Phytoconstituents, Shivlingi.

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## INTRODUCTION

*Bryonia laciniosa* Linn. commonly known as the "Shivlingi" has medicinal properties and is termed a medicinal plant with the family Cucurbitaceae. Shivlingi Seeds (Beej) are used in the treatment of female infertility. Also used as the uterine tonic and boost the chances of conception in women suffering from infertility. The shivlingi beej is act as a fertility enhancer herb used in Ayurveda along with Putra jeevak Beej. However, it has different ayurvedic characteristics, and based on these characteristics, it decreases Kapha Dosha. And that's a reason why the Shivlingi is more advantageous if the patient exhibits more signs of heightened or enhanced Kapha. But if the patient's Pitta Dosha has risen or aggravated, it is not appropriate.<sup>[1]</sup> Other Species of *Bryonia laciniosa* are *Bryonia geminate*, *Bryonia acuta*, *Bryonia epigaea*, *Bryonia callosa*, *Bryonia cretica*, *Bryonia alba*, and *Bryonia aspera* (Table 1).<sup>[2]</sup>

*Bryonia laciniosa* is an Ayurvedic herb. As Vrishya Rasayana in Ayurvedic scriptures. It is widespread in India and is referred

to as Shivlingi there. *Bryonia laciniosa* seeds are referred to as "Shivlingi" because the top surface of the seeds resembles a "Shivlingi," a popularly worshipped Hindu divinity (Table 2).<sup>[3]</sup>

In terms of resources and accessibility to medicinal plants, India is among the richest nations. We have relied on trees for food, housing, clothing, decoration, religious beliefs, and most importantly, health care, from the beginning of time. Because of the potency of these therapeutic plants, tribes that live mostly in forested and mountainous locations rely on them. There are more than 2500 plant species whose therapeutic properties have been established. Although more than 6000 plants have been identified as having medicinal properties. Worldwide, more than 50,000 plants have been discovered and utilized for therapeutic reasons. For their fundamental medical requirements, tribal groups have a variety of traditional remedies based on local flora.<sup>[4-6]</sup>

Infertility has been a widespread occurrence since ancient times and may continue for as long as there are humans. Every human has a deep, innate urge to carry on their own race. Depending on they are where live, between 8 and 12 percent of couples worldwide are thought to be impacted by infertility. According to the WHO, the incidence of primary infertility in India ranges from 3.9 to 16.8%. Couples seek help from traditional medicine, which has been practiced for millennia, in the case of infertility since Ayurveda is well respected and trusted in this area.<sup>[8]</sup>



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## Geographical Distribution

The Shivlingi were found in the countries like Nepal, South Korea, Pakistan, Thailand, the Philippines, China, Sri Lanka, Australia, Tropical Africa, Indonesia, Bhutan, and the Philippine Islands. Among the Indian states where it exists are Andhra Pradesh, Bihar, Chhattisgarh, Goa, Gujarat, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Rajasthan, Tamil Nadu, Tripura, and Uttar Pradesh.<sup>[9]</sup>

## Morphological character

**Stem:** Enormously expanded, thin, scored, labrous. Rings are Slender, striate, glabrous.

**Leaves:** Membraneous, 10-15 cm long and expansive, green and scabrid above, paler, and smooth or almost so underneath. Profoundly cordate at base. 5-lobed, processes elongated, lanceolate, midrib sometimes serrated. Petioles are 2.5-7.5 cm long, striate, slim.

**Male flower:** With little fascicles of 3-6, peduncle 5-20 mm long, filiform, glabrous. Calyx is glabrous with longer about 205 mm, teeth is subulate. Corolla 3-5 mm long, segmented, clap, ovate, intense, pubescent, females-single or few or many stalked, shorter than males.

**Fruit:** The fruits are the Organic products which are Subsessile, with about 1.3-205 cm in breadth, smooth, globose, pale blue green, streaked with wide vertical lines and having seeds longer about 5-6 mm with yellowish cocoa (Figure 1).

## Seed

**Colour:** Yellowish Cocoa

**Appearance:** Upper surface of the seeds resembles like a "Shivlingi,"

**Size:** 5-6mm long.<sup>[10]</sup>

## Parts used

Fruits, Leaves, Seeds (Especially seeds)

Shivlingi Beej or seeds are usually used for the treatment of female infertility. Seeds have anti-fungal, antihyperlipidemic, antimicrobial, anti-inflammatory, spermatogenic, analgesic, and antipyretic properties.<sup>[11]</sup>

## AYURVEDIC CHARACTERISTICS

### Ethnobotany

The plant plays an important role in tribal society and customs, and is used as an ingredient in numerous natural medicines. Commonly known as 'Shivlingi' and 'Gargumaru' in India, it is an annual climber with magnificent organic red plants and is considered highly therapeutic.<sup>[13]</sup> Locally in India, its seeds are

used to promote parenthood in women. The Gond and Bharia tribes of the Patalkot Valley worship this plant. According to them, this herb is helpful for people without children. They also claim that the seeds of the plant have a stimulating agent to improve sperm quality and sexual desire. In addition, it acts as a tonic to improve physical and mental health and strengthen youth in old age. Home healers (bhumkas) prepare an herbal mixture and recommend it to the desired person. Interestingly, the city of Bhumkasin Harra-Ka-Chhar in Patalkot recommends the seeds of this herb to conceive sons. In Gaildubba, traditional healers make a mix Shivlingi seeds with Tulsi leaves (*Ocimum basilicum*) and mix them with jaggery (the grungy sugar traditionally used in India) and offer it to the woman who for some reason doesn't offer her a baby, she thinks. Shivlingi is a twin sister and is easily recognized by its flower/nature/seed. In addition, the smell of the plant is also an unmistakable feature (Figure 2).<sup>[14]</sup>

## Phytochemistry of *Bryonia laciniosa*

The main chemical component of the plant is bryonin. Plant seeds contain molecules of saponins, flavonoids, phenolic acids, sugars, punicic acid, goniiothalamine, and glucomannan. Polysaccharides and fatty acids are isolated from the pulp of the plant. The polysaccharide contains D-glucose, D-mannose, and L-arabinose in a 5:3:4 ratio. However, detailed studies on phytochemical screening of plants are not yet available. Various concentrates were observed to contain *Bryonia laciniosa*.<sup>[15]</sup>

1. Punicic acid.
2. Goniiothalamine.
3. Glucomannan.

## INFERTILITY

Hormonal imbalances, physical and psychological stress, environmental and genetic variables all play a role in pathogenesis and lead to disorders of sperm characteristics. Infertility is also associated with psychological stress from not reproducing, leading to frustration and disappointment. Prolonged stress also increases blood cortisol levels, which affect spermatogenesis and generate Reactive Oxygen Species (ROS). The rationale for using these treatments is based on the idea that some types of male infertility are caused by oxidative stress and hormonal imbalances, such as *Asparagus racemosus*, *Mucuna pruriens*, *Tinospora cardii*. Based on the idea that alternative medicines can help improve male fertility and semen quality, using botanical products such as Folia.<sup>[16]</sup>

## MALE INFERTILITY

Dehydroepiandrosterone (DHEA) is an adrenal steroid that acts as an indirect building block for other hormones and has weak androgenic (testosterone-producing) and estrogenic (estrogen-producing) effects, depending on the body's needs and

hormonal balance. DHEA levels begin relatively low at birth and rise gradually until puberty, after which levels begin to decline with age. It helps in recovery and may provide other health benefits. As already mentioned, Shivlingi has androgenic properties and acts on the hypothalamic-hypogonadal axis. In case of oligospermia, asthenospermia, in case of oligospermia, in asthenozoospermia and in case of oligospermia, in asthenospermia and in case of oligospermia, asthenospermia, Sibringi, through its rasayan karma, these conditions are treated through the androgenic effects of DHEA. In azoospermia, sperm are absent due to an impairment or failure of spermatogenesis. The disorder can be alleviated by treatment with katu rasa, ushna velya and rasayana which reduce the quality and cause spermatogenesis.<sup>[16]</sup>

## FEMALE INFERTILITY

Diminished Ovarian Reserve (DOR) is a condition that causes infertility, primarily seen in older women. Aartava-kshaya, which may be correlated with DOR, has been described as the absence or loss of premature, delayed, or sparse Aartava-dosha which can occur in any state. Shivlingi is known for its androgenic properties. It also helps patients who have ovulation problems common in diseases such as DOR. The Rasayan activity of Siblingi assists in the formation of the purest Rasa Datu, which is transformed into the Upadatu Artava, which has essential properties for fertilization. In this case, Rasayan Karma could theoretically work via DHEA-mediated androgenic effects.<sup>[17]</sup>

## THERAPEUTIC AND PHARMACOLOGICAL ACTIVITY

*Bryonia laciniosa* is one of most important ancient herbal medicine which is used for various activity. And it's already has been reported that the different kind of extract of the Shivlingi are used in different diseased condition i.e. ethanolic extract of the Shivlingi was examined for the antimicrobial activity (Figure 3).<sup>[18]</sup>

We had found that the *Bryonia laciniosa* plant is accompanying with various therapeutic and pharmacological properties. Some of the studies are described below;

### Anti-Microbial Activity

The researcher Ehsan, Vital and Bipinraj was conducted a study on Ethanol extracts of the seeds of *Bryonia laciniosa* plants were assayed for antimicrobial activity against various pathogenic microorganisms by the agar-well diffusion method. Plant leaf and stem extracts showed antibacterial activity against a variety of Gram-positive and Gram-negative bacteria. A significant growth inhibitory effect of each extract was observed against *Staphylococcus aureus*, *Staphylococcus aureus*, and *Bacillus cereus*. Minimal inhibitory effects were reported with plant parent

extracts against Gram-positive and Gram-negative bacteria. From this study, it was concluded that the *B. laciniosa* plant was used as an antimicrobial agent.<sup>[18]</sup>

### Anti-Bacterial Activity

Colston and Cox conducted a study using an aqueous extract of the polysaccharide constituents isolated from *Bryonia laciniosa* leaves, and at a dose of 1.25 mg/mL, *S. aureus*, *S. pyogenes*, *E. coli*, and *S. aureus*. Antibacterial activity against Aerogenes was examined. mg/mL, 6.25 mg/mL, and 12.5 mg/mL. The extract showed antibacterial activity against *E. coli* at a minimum dose of 6.25 mg/ml.<sup>[19]</sup>

### Analgesic

An alcoholic extract of the dried aerial parts of *Bryonia laciniosa* was used by scientists Reddy, Gnanasekaran, and others. in a mouse model using Eddy's hot plate analgesia meter. Models were dosed with standard drugs, placed on an electrically heated plate at 55°C +/- 0.5°C, and time was recorded. A similar study was performed on animals administered plant extracts. Results showed significant analgesic activity after 30-60 minutes compared to standard drug. The *B. laciniosa* - treated group shows an extended response time to nociceptive stimuli compared with the control group. H. The increase in reaction time increased from 5.83 seconds to 8.50 seconds after 30 minutes and from 5.67 sec to 10.5 sec after 1 hr of treatment.<sup>[20]</sup>

### Anti-inflammatory

Sud K. et al., used chloroform extracts of *Bryonia laciniosa* leaves to demonstrate anti-inflammatory properties against carrageenan-, dextran-, serotonin-, and histamine-induced rat paw edema and cotton pellet-induced (chronic) granuloma models in rats. Oral administration of plant extracts in a mouse model was performed by the carrageenan peritonitis test. As per research they found a significant anti-inflammatory effect of the plant extract on the mouse model in a dose-dependent manner at doses of 50, 100, and 200 mg/kg.<sup>[21]</sup>

The extract showed maximal inhibitory effect (52.4%) at a dose of 200 mg/kg after 3 hours. The standard drug showed 62.1% inhibition in animal model. In dextran-induced paw edema, chloroform extract shows a dose-dependent significant inhibition (34.4, 43.2, 52.1%) compared to the control group. For histamine- and serotonin-induced paw edema, chloroform extract at a dose of 200 mg/kg showed 54.9 and 52.3% inhibition and indomethacin showed 59.8 and 59.5% inhibition. In cotton pellet-induced granuloma (chronic model), CEBl (Chloroform Extract of *Bryonia laciniosa*) (200 mg/kg) reduced the percentage of granuloma tissue by 50.1% and 57.3%, respectively. Inhibition of peritoneal leukocyte migration at doses of 50, 100, and 200 mg/kg was also inhibited by CEBl.<sup>[13]</sup>



Figure 1: Morphological Characteristics of Shivlingi.

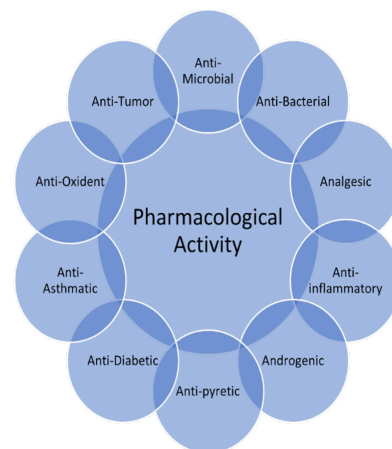


Figure 3: Pharmacological Activity of Shivlingi.

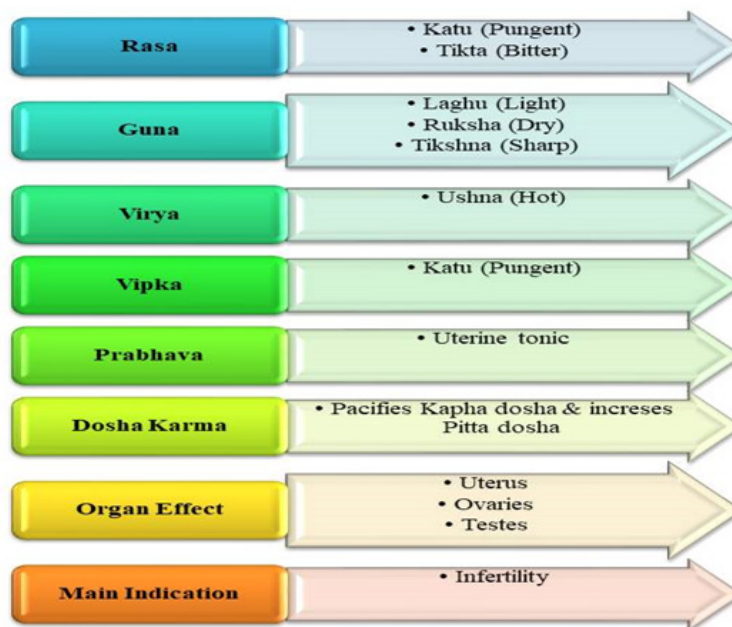


Figure 2: Ayurvedic Characteristics of *Bryonia laciniosa* [12].

Table 1: Taxonomical Classification of *Bryonia laciniosa* [7].

Taxonomical Rank	Taxon
Division	Eukaryota
Kingdom	Plantae
Sub-kingdom	Tracheobionta
Super-Division	Spermatophyta
Class	Magnoliopsida
Sub-class	Dilleniidae
Order	Violales
Family	Cucurbitaceae
Genus	<i>Bryonia</i> L.
Species	<i>Bryonia laciniosa</i> Linn.

Table 2: Vernacular names of *Bryonia laciniosa* plant [7].

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

## Androgenic

An ethanol extract of *Bryonia laciniosa* seeds was tested for androgenic activity against a male albino rat model. They found that groups of male albino rats were orally administered plant extracts at doses of 50, 100 and 150 mg/kg body weight/day for 28 days. Results showed an increase in body weight, prostate, seminal vesicle, epididymis, and testis weight. Significant increases in sperm count, fructose levels, serum testosterone, luteinizing hormone levels, and spermatogenesis were also observed. showed androgenic activity.<sup>[21]</sup>

## Antipyretic

Plant *Bryonia laciniosa* methanol extracts were evaluated for antipyretic activity in comparison to standard animal models by assessing normal body temperature and yeast-induced hyperthermia. They found that he had a significant drop in body temperature up to 4 hours after administration of the extract. Therefore, it showed antipyretic action.<sup>[22]</sup>

## Antidiabetic

Patel SB *et al.*, conducted a study on ethanol extract and saponin fractions of *Bryonia laciniosa* seeds for antidiabetic activity in neonatal streptozotocin-induced diabetic rats for 10 weeks. As per research, levels of glucose, cholesterol, triglycerides, low-density lipoprotein, high-density lipoprotein, serum creatinine, and serum urea were significantly reduced, as were levels of aspartate transaminase and alanine transaminase. Significant increases in catalase, superoxide, and glutathione levels were also seen in n-STZ diabetic rats.<sup>[23]</sup>

## Anti-asthmatic

Sanjeev Kumar CB *et al.*, studied anti-asthmatic activity by counting mesenteric mast cells in a method of atopic allergy in rats. They counted the number of intact and destroyed mast cells in 10 randomly selected fields of each tissue. Re an increase in the percentage of granulation formation in *Bryonia laciniosa*-treated samples compared to the control group of samples.<sup>[24]</sup>

## Antioxidant

Chloroform extracts of *Bryonia laciniosa* fruits were assayed to assess their in vitro antioxidant activity using DPPH (1,1-diphenyl-2-picryl-hydrazyl, ABTS, hydrogen peroxide and FRAP assays).<sup>[25]</sup> As per research they found decrease in the degree of absorbance. Ascorbic acid (AA), 95% ethanol and His DPPH solution were used as standards and controls, respectively, and recorded using a UV-vis spectrophotometer at 517 nm.<sup>[26]</sup>

## Antitumor

Sivakumar T *et al.* Carried out experimental study. For this study they choose mouse model and evaluate the antitumor activity of methanol extracts of plants. The extract was administered to

the mouse model 24 hours after his tumor inoculation at doses of 62.5, 125, and 250 mg/kg for 14 days. The results showed a significant reduction in tumor volume and viable cell numbers, thereby extending the lifespan of EAC-bearing mice. An increase in Glutathione (GSH), Superoxide Dismutase (SOD), catalase and a decrease in the extent of lipid peroxidation were also observed.<sup>[27]</sup>

## Toxicity

Sanjeev Kumar CB *et al.*, studied toxicity. Hexane extract of the *Bryonia laciniosa* plant was tested for cytotoxicity at different doses. H. MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl-2H-tetrazolium hydrobromide) assay. The hexane extracts were observed to exhibit dose-dependent cytotoxicity, which increased with increasing concentration. The maximum cytotoxicity evaluated was 75.25±2.4% at a concentration of 10000 µg/ml with an IC<sub>50</sub> value of 453.33±1.6 µg/ml.<sup>[28]</sup>

## GENERAL INDICATION FOR SHIVLINGI BEEJ<sup>[29]</sup>

### Dosage

Shivlingi Beej is typically taken in the following dosages.

### Adults

1-3 gm. Maximum possible dosage: 6 grams per day (divided doses).

### Dosage

Twice daily with milk, warm water for weight loss.

### Best time to take

3 hr after meals.

### Recommended duration of treatment

At least 3 months (some patients may require 6 months or more treatment with Sibringi depending on their condition).

### Security Profile

Shivlingi is safe for most people when taken as directed and in the proper dosage under professional supervision. is not very suitable. No side effects have been reported with shivlingi when used judiciously according to the doshas and indications.

### Allergic reactions (allergies)

Not clear.

### Pregnancy and breastfeeding

Sibringi may be safe to consume during pregnancy and breastfeeding. When women take it for fertility treatment and take it unknowingly in early pregnancy, no side effects have been reported.

## Contraindications

Shivlingi Beej has no absolute contraindications.

## Interactions with other drugs

Not clear.

## CONCLUSION

Literature research has shown that the Shivlingi plant is of great medical importance. It is regarded as a fantastic treatment for infertility. Seeds of the plant are mainly used for medicinal purposes. In Ayurvedic and folk medicine, the seeds of the *B. laciniosa* plant are used to treat a variety of conditions including male and female infertility, obesity, weight loss, diabetes, inflammation, constipation, and abdominal ailments. Reports have found that plants are associated with various therapeutic and pharmacological properties such as antidiabetic, androgenic, Antiasthmatic, antipyretic, antibacterial, and antibacterial activity. However, this plant has been poorly studied for its phytochemical constituents and therapeutic properties. Therefore, plants should receive more attention from researchers and scientists for experimental and clinical studies to identify beneficial pharmacological properties for the development of important therapeutics.

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## CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

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