

## A REVIEW ON HEDYCHIUM SPICATUM - SHATI

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## ABSTRACT

*Hedychium spicatum* Buch.Ham. (Zingiberaceae), commonly known as spiked ginger lily, is found in the entire Himalayan region. *H. spicatum* has become vulnerable due to reduction in population of over 20% in the last ten years. In ayurveda, the rhizomes are used in the treatment of respiratory disorders, fevers, tranquilizer, antispasmodic, CNS depressant, analgesic, anti-inflammatory, antimicrobial, antioxidant, antifungal. The aim of the present paper is to give a detailed literature review on phytochemistry, modern and Ayurvedic pharmacological activities.

## INTRODUCTION

*Hedychium spicatum* Ham.ex Smith. (Zingiberaceae) is an Ayurvedic traditional medicinal plant popularly known as *Shati* in sanskrit and known as Spiked Ginger Lily in English. The Rhizome of the plant is carminative, spasmolytic, hepatoprotective, anti-inflammatory, antiemetic, anti-diarrhoeal, analgesic, expectorant, antiasthmatic, emmenagogue, hypoglycaemic, hypotensive, antimicrobial, anthelmintic. Due to excessive unscientific harvestation, this herb is listed under vulnerable medicinal plant list by IUCN.

**Vernacular names<sup>1</sup>:** Sanskrit- *Shati*, English - *Spiked ginger lily*, Hindi – *Kapurkachari*, Bengali - *Shati*, Kachri. Gujarati - *Kapurkachari*, *Kapurkachali*, Marathi – *Kapurkachari*, Punjabi - *Kachur*, *kachoor*, *Sheduri*, Tamil - *Poolankizangu*, *KichiliKizongu*, Telugu – *Gandhakachuralu*, Oriya - *Gandhasunthi*.

**Morphology<sup>2</sup>** *Hedychium spicatum* Buch-Ham. is a tall perennial herb with leafy stems and grows up to 1.5m by 0.7m. The leaves oblong or oblong-lanceolate, reaching 30 cm or more. Spikes sometimes 30 cm, densely flowered, bracts large, oblong, obtuse, calyx shorter than bract flower white ascending and closely imbricate type. Stamen rather shorter than lip, anther

linear, capsule glabrous, globose. It flowers in October. The flowers are hermaphrodite (has both male and female organs). *Hedychium spicatum* grows well in moist soil, sunny position and wide range of climatic conditions of forest margins from 1500 to 2800m altitude. Plants seem to be immune to the predations of rabbits. The tubers should only just be covered with soil. The plant prefers light (sandy), medium (loamy) and heavy (clay) soils. The plant thrives better in acid, neutral and basic (alkaline) soils. It cannot grow in the shade and susceptible to frost.

**Morphological features<sup>3,4</sup>**

**Macroscopic characters:** Proper examination of the untreated sample of rhizomes of the *Hedychium spicatum* was carried out under diffused sunlight and artificial source similar to day light. The rhizomes are cylindrical, externally light yellowish brown layer covered the edges with scars and rings, rudiments of rootlet are also visible, 10-30cm long and 2-2.5 cm in diameter. Odour is camphoraceous and taste is bitter.

**Microscopic Characters:** Microscopic characters showed the presence of cork consisting of a outer zone of irregularly arranged cells and inner zone of radially arranged cells followed by a wide zone of cortex 20-30 cells thick, some cortical

cells filled with flattened and oval oblong starch grains. Numerous oleoresins cells also found in the zone. Closed collateral fibrovascular bundles are also found in the cortex. Ground tissue composed of large parenchymatous cells with abundant starch grains and oils.

**Ayurvedic literature**<sup>5</sup>: Synonyms: In Ayurveda, it is also denoted with various names such as Shathi, Shati, Gandhashathi, Gandhapalaashi, Kapuurkachari, Suvrataa, Gandhaarikaa, Gandhavadhuu, Gandhamuulikaa.

Ayurvedic properties: **Rasa** - Katu, Tikta, Kashaya, **Guna** - Laghu, Teekshna, **Veerya** - Ushna. **Vipaka** – Katu, **Doshagnata** – Kaphavatashamaka, **Rogagnata** – Aama, Kaasa, shwaasa, Shoola, Hikka, Gulma, **Karma** - Vedansthapana, Dur-gandhanashana, Grahi, Deepana, Shoolaprashamana, Hikkanigrahana.

**Threat status**<sup>6,7</sup>: According to the threat status of the World Conservation Union (International Union for Conservation of Nature and Natural resources; IUCN) criteria *H. spicatum* has become vulnerable due to reduction in population of over 20% in the last ten years. It is also listed in the near threatened category of the essential oil bearing plants.

**Phytochemical composition**<sup>8,9</sup>: The rhizome extract contains essential oil, starch, resins, organic acids, glycosides, albumen and saccharides, which is administered for blood purification, bronchitis, indigestion, treatment of eye disease and inflammations. Chemically, the rhizome is reported to contain sitosterol and its glucosides, furanoid diterpene-hedychenone and 7-hydroxyhedychenone. Essential oil contains cineole, terpinene, limonene, phellandrene, p-cymene, linalool and terpineol as major constituents.

**Pharmacological Review**: The following are the pharmacological actions of *Hedychium spicatum* reported till date.

**Tranquilizing Action**<sup>10</sup>: Essential oil of rhizomes of *H. spicatum* was reported to possess mild tranquilizing action of short duration. It depressed conditioned avoidance response, rota rod performance and

potentiated the phenobarbitone hypnosis and morphine analgesia in rats.

**Bronchial Asthma**<sup>11</sup>: The powdered rhizome of *H. spicatum*, given 10 g in divided doses to 25 patients with recurrent paroxysmal attacks of dyspnea (bronchial asthma) for 4 weeks, completely relieved dyspnea, cough and restlessness in all the patients. The ronchi completely disappeared in 36 % of the patients. The mean respiration rate was reduced by 25 % and the vital capacity was increased by 20 %. The mean absolute eosinophil count also declined by 55.6 %. In another study 16 patients of bronchial asthma were given 1 g of powder thrice daily for 21 days, with plain water. The chief complaints like breathlessness, cough, chest heaviness, loss of appetite, uneasiness during exercise and sleeplessness etc were relieved with varying degree of relief in all the patients.

**Pulmonary Eosinophilia**<sup>12</sup>: In a clinical study, 15 patients of tropical pulmonary eosinophilia were treated with the powder of *H. spicatum* in the dose of 6g b.i.d. After 4 weeks of treatment, the eosinophil count was reduced by 60.54 % to 36%. In another clinical study conducted on children suffering from tropical pulmonary eosinophilia, *H. spicatum* was found to give relief in signs and the symptoms and reduce the blood eosinophil level in dose of 70 mg/kg of body weight. Though most of the symptoms were relieved within one to three weeks period, radiological findings and lymphadenopathy were normalized after a considerably prolonged period.

**Anthelmintic Activity**<sup>13</sup>: The anthelmintic activity of rhizomes of *H. spicatum* against adult Indian earthworms. The time taken for each worm for paralysis and death was determined. The results were compared with that of standard i.e., piperazine citrate. Methanol extract of *H. spicatum* produced dose dependent anthelmintic activ-

ity where asaquesous extract was not all effective. Methanol extract showed better anthelmintic activity when compared with the standard drug piperazine citrate.

**Antioxidant Activity<sup>14</sup>:** Terpenoid compositions of rhizome of *H. spicatum* were found to possess antioxidant activity. The rhizome essential oils of *H.spicatum* collected from three different regions exhibited difference in the relative content of essential oils which were studied for their antioxidant activity by DPPH radical scavenging activity, reducing power, and effect on the chelating properties of Fe<sup>2+</sup>. The rhizome essential oil from all the regions exhibited moderate to good Fe<sup>2+</sup> chelating activity where as the essential oil exhibited a completely different DPPH radical scavenging profile.

## CONCLUSION

*Hedichium spicatum* is a one of popular medicinal plant mentioned in Ayurvedic literature, has been listed as vulnerable medicinal plant. Therefore, prioritization needs to be done for propagation and cultivation of this species at large scale, using plant tissue culture techniques and conventional methods. Shati has been mentioned extensively in respiratory diseases by Ayurvedic texts. Many recent studies have proven its efficacy in bronchial asthma, allergic conditions. This drug requires further extensive pharmacological and clinical studies.

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