WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 14, Issue 1, 987-992. Review Article ISSN 2277–7105

REVIEW ON HEDYCHIUM SPICATUM

Nikita*, Dimpal and Akanksha Sharma

*Assistant Professor, School of Pharmacy, IEC University, Baddi, Himachal Pradesh.
Abhilashi University Chailchowk Mandi, H.P.

Article Received on
16 Nov. 2024,
Revised on 06 Dec. 2024,
Accepted on 27 Dec. 2024
DOI: 10.20959/wjpr20251-35006

***Corresponding Author**
Nikita
Assistant Professor, School of Pharmacy, IEC University, Baddi, Himachal Pradesh.

ABSTRACT

The rhizomatous herb Hedychium spicatum Buch. Ham. ex D.Don. (Family Zingiberaceae) is utilized in the food, pharmaceutical, cosmetic, and perfumery industries. It has long been used to treat a variety of conditions, including pain, inflammation, bronchitis, asthma, foul breath, vomiting, diarrhea, and blood disorders. This study thoroughly examined the pharmacological characteristics, bioactive components, traditional and folk uses, and market potential of H. spicatum. Future research possibilities and research gaps have also been explored. According to literature, the species' beneficial qualities lack a precise scientific foundation. However, a few additional unique biological traits found in this species have also created fresh opportunities for its uses. Therefore, some suggestive scientific evidence for the species' potential in the pharmaceutical, food, and aromatic industries has been provided by the mentioned phytochemical constituents, such as phenolic and flavonoid compounds, and related pharmacological activities, such as antimicrobial, anti-inflammatory, and antioxidant activity of the species.

INTRODUCTION

Worldwide recognition of the therapeutic potential of medicinal plants has grown. This popularity can be explained by the fact that 70% of modern medications are made from medicinal plants, 85% of traditional medicine in developing nations uses plant extracts, and over 80% of the residents of these countries rely on it. Given that medicinal plants and their parts, either alone or in combination, can effectively treat a wide range of human ailments, the pharmaceutical and food sectors continue to be highly curious in these therapeutic plants.

Hedychium spicatum Buch. Ham. ex D. Don, also referred to as "spiked ginger lily," "Van haldi," or "Kapoorka-chari," is a species that is significant due to its culinary and therapeutic uses. The species is indigenous to temperate and subtropical regions in southeast Asian nations, with elevations between 1000 and 2800 meters above sea level. Both conventional and contemporary medical, cosmetics, and fragrance industries employ it. Due to overexploitation of the wild for essential oil, the species is now classified as uncommon and vulnerable.

An overview of the species' traditional usage, essential oil content, and trade value was provided in the first review, which was published in 2010. About eighteen essential oil compounds and a few other chemical components were listed in this review. The pharmacological activity of the species was the main topic of the second review, which was published in 2011. A small number of compounds were listed in this review without any more in-depth information. This review also discusses the pharmacological properties of the species and covers the pharmacognosy work that has been done in the species.

Botanical Description

The plant is a leafy herb that may grow up to 2 meters tall. It has sessile leaves that are broadly lanceolate, 30 to 60 cm long with long clasping sheaths, and up to 10 cm wide . It also has a camphoraceous horizontal rhizome. Pale yellow flowers with a pink base and a corolla tube up to 5 cm long that encloses scarlet anthers and white staminoides are fragrant. They are hermaphrodite blooms. When the fruits ripen, their globose capsules with three retractable valves reveal a multitude of tiny seeds embedded in a scarlet aril. June through October is flowering time, while October through November is fruiting time.[12] The species is found throughout the Himalayan area, from Jammu and Kashmir to Arunachal Pradesh, Nepal, Bhutan, Myanmar, North Thailand, and a small portion of China.

Figure 1: Different growth stages of Hedychium spicatum.

Leaves: Lance- shaped, typically 20-30 cm long, with a glossy green appearance.

Flowers Fragrant, white or pale yellow with an orange center, blooming in dense spikes.

Rhizomes: Aromatic and fleshy, the rhizomes are the most commonly used part of the plant for various applications.

Habitat

Geographical Range: Predominantly found in the Himalayan regions of India, Nepal, Bhutan, and Myanmar.

Environment: Prefers forested areas with rich, moist soil and partial shade.

Uses

Medicinal: The rhizomes are used in traditional medicine for their anti-inflammatory, antimicrobial, and digestive properties. They are often used to treat respiratory ailments, gastrointestinal disorders, and skin diseases.

Aromatic: The plant is used in the production of perfumes and incense due to its pleasant fragrance.

Ornamental: Valued for its attractive flowers and foliage, making it popular in gardens and landscaping.

Cultivation

Soil: Requires well-drained, fertile soil with high organic matter content.

Watering: Needs regular watering but should not be waterlogged.

Propagation: Typically propagated through rhizome division or seeds.

Conservation

Status: Not currently listed as endangered, but habitat loss and overharvesting for medicinal purposes pose potential threats.

Hedychium spicatum is a versatile and valuable plant with significant cultural, medicinal, and aesthetic importance.

Botanical Characteristics

Family: Zingiberaceae

Genus: Hedychium

Species: H. spicatum

Hedychium spicatum is a robust herbaceous plant that can grow up to 1.5 meters in height. It features large, lanceolate leaves that are arranged alternately along the stem. The plant produces strikingly beautiful, fragrant flowers that are typically white or yellow with a hint of orange, blooming in dense spikes. The rhizomes are thick, aromatic, and yellowish-brown, which are extensively used in traditional medicine and perfumery.

Phytochemistry

Hedychium spicatum is rich in various bioactive compounds, including:

Essential Oils: The rhizomes contain essential oils, with major constituents being 1,8-cineole, β-pinene, and linalool.

Flavonoids: Such as quercetin and kaempferol.

Terpenoids: Including sesquiterpenes and diterpenes.

Phenolic Compounds: Known for their antioxidant properties.

Pharmacological Activities

Research has highlighted several pharmacological activities of Hedychium spicatum:

Antidiabetic activity: The essential oil obtained from the rhizomes of Hedychium spicatum possesses significant antidiabetic activity. The main compound responsible for antidiabetic activity was found to be 1, 8 cineole. The oral doses of 0.3 ml/rat of Hedychium spicatum essential oil administered for 14 days reduced the blood glucose and urea level significantly as compared to the normal control.

Anti-asthmatic and anti-allergic activities: Extractions in water and ethanol from the dehydrated rhizome of H.spicatum were assessed for their anti-inflammatory, anti-histaminic, and ulcer-protective properties in guinea pigs (GP).as well as acute toxicity in mice and analgesic effects in rats. Application of ethanolicand aqueous extracts of Hedychium spicatum displayed a noticeable stomach ulcer. shielding general practitioners against histamine-induced stomach ulcers. Additionally, anti-inflammatory effect was generated by both the extracts to prevent rats' paw edema caused by carrageenan from one hour onward, reaching its peak at three hours. The benzene extract from the rhizome of H. spicatum showed notable Mice writhed due to analgesic action in acetic acid. Neither extract had any harmful effects, such as elevated clonic convulsion, coma, motor activity, salivation, and death even at the dosage of 2000 mg/kg.

Anti-inflammatory: The species' alcoholic extract significantly reduces inflammation when it comes to rat and mouse hindpaw oedema caused by carrageenan. The maximal activity of hexane soluble extract was found to be 42.16% in mice (200 mg/kg) and 27.2% in rats (100 mg/kg), in contrast to 37% in mice treated with indomethacin (2 mg/kg) and 27.2% in rats treated with phenylbutazone (30 mg/kg).[35] At a dosage of 200 mg/kg, the hexane and benzene portions of Hedychium reduced the formation of granulomas by 8 and 5%, respectively. In the same experiment, phenylbutazone (30 mg/kg) reduced the formation of granulomas by 25%. In the phenylquinone writhing test, the hexane extract had an ED 50 value of 284.53, while the benzene extract had an ED 50 value of 93.28. In a different experiment, mice and rats were given an oral alcoholic plant extract suspended in Tween-80. **Antimicrobial:** The essential oil and extracts have shown potent antimicrobial properties against various bacterial and fungal pathogens.

Anthelmintic activity

The evaluation focused on the anthelmintic activity of H. spicatum rhizomes against adult Pheretima posthuma Indian earthworms. The amount of time needed for paralysis and Death was identified. The outcome was contrasted with that of piperazine citrate, the standard. H in methanol extract. Spicatum exhibited anthelmintic action that was dose-dependent. Aqueous extract, however, did not always work well. Methanol extract exhibited superior anthelmintic efficacy in comparison to utilizing the common medication piperazine citrate.

Antioxidant: The presence of phenolic compounds contributes to the antioxidant activity, which helps in neutralizing free radicals and reducing oxidative stress.

Bronchodilator: The rhizomes have demonstrated bronchodilatory effects, supporting their use in managing respiratory ailments.

Potential Applications

Pharmaceuticals: Hedychium spicatum can be explored further for developing new drugs for treating inflammation, microbial infections, and respiratory disorders.

Cosmetics and Perfumery: The aromatic essential oil is valuable in the cosmetic industry for making perfumes, lotions, and other fragrant products.

Nutraceuticals: The antioxidant properties make it a potential candidate for use in nutraceuticals and dietary supplements.

Industrial use of H.spicatum

Many herbal medicines combine its essential oil, extract, and powdered rhizome. H. spicatum's rhizome is the source of natural secondary oils 41, 49, and several others. metabolites, such as alcohols, phenols, aldehydes, and terpenes 49, 51 and 59. Many medical benefits can be obtained from its essential oils. containing analgesic and anti-inflammatory properties. Using it as a mild sedative and depressive for the central nervous system 54, antibacterial and antibiotic 50; pediculicidal in vitro 64; hepatoprotective in vitro and use in cosmetics raises the need for raw materials in the industrial sector 73.

CONCLUSION

Hedychium spicatum is a plant of significant medicinal and aromatic value. Its rich phytochemical profile and diverse pharmacological activities validate its traditional uses and highlight its potential for various industrial applications. Further research and development could lead to the discovery of new therapeutic agents and products derived from this versatile herb.

REFERENCE

1. Vieira RF, Skorupa LA. Brazilianmedicinal plant gene bank. Acta Hort, 1993; 330: 51–58.
2. Singhal S, Agrawal A. Industrial utilization and promotion of medicinal plants in India. In: Chopra AK, Khanna DR, Prasad G, Malik DS, Bhutiani R, eds. Medicinal Plant:Conservation Cultivation and Utilization. New Delhi, India: Daya Publishing House, 2007; 325–330.
3. Constable F. Medicinal plant biotechnology. Planta Med., 1990; 56: 421–425.
4. Kaur H, Richa.R. Antidiabetic Activity of Essential Oil of Hedychium spicatum. International Journal of Pharmacognosy and Phytochemical Research, 2017; 9(6).
5. Tandon SK, Chandra S, Gupta S, Lal J. Analgesic and antiinflammatory effects of Hedychium spicatum. Indian J Pharma Sci., 1997; 59(3): 148-50.
6. Sravani T, Padmaa MP.Evaluation of anthelmintic activity of rhizomes of Hedychium spicatum Buch. Ham. Int. J. Res. Pharm. Sci., 2011; 2(1): 66-68.