

Himalayan Stinging Nettle Plant (Bicchu Ghas): Nutritional Composition and Pharmacological Applications

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Himalayan stinging nettle is a wild plant with great economic value. The plant is known to the hill people of the Himalayas for its vegetables and is famous in Ayurveda. It is also used in folk medicine by the people of hill regions. Like other green leafy vegetables, the stinging nettle plant has got high amounts of β -carotene and calcium. The plant is also rich in various nutrients such as vitamins, minerals, amino acids, essential fatty acids etc. The secondary metabolites of the plant have anti-inflammatory, antiviral, antibacterial, anticancer and analgesic functions. Consumption of the plants plays a significant role in alleviating various problems such as benign prostatic hyperplasia (BPH), arthritis, diabetes, cancers, inflammation, liver problems, GIT problems, ulcers, skin disorders etc.

Uttarakhand is a hub of biodiversity, which is supported by its diverse flora and fauna composition. The state has a floristically rich diversity of various uncommon and rare plant species that have an important role in ethnomedicine. These uncommon plants have various advantages. The nutritive value of these uncommon plants is quite higher than that of other common plants. These plants are traditionally consumed by the local people of the Garhwal and Kumoun regions. The people have rich traditional knowledge of various uncommon plants and they utilize these plants for various purposes.

The stinging nettle or Himalayan nettle plant belongs to the *Urticaceae* family or nettle family which is the family of wild, herbaceous perennial plants native to Europe but are also found in various parts of Asia, Africa and North America. There are about total 30-45 species of these plants in the Himalayan region. The two most common varieties of the nettles are *Urtica dioica* and *Urtica parviflora* which are found in the sub-tropical Himalayan region in India. It is widely present in the states like Uttarakhand, Kashmir, Sikkim, West Bengal, Arunachal Pradesh and Tamil Nadu. Some common names of the plant in English are Common Nettle Plant, Himalayan Stinging Nettle, Stinging Nettle; in Hindi and Punjabi it is known as Bichhubuti and Bichhu Ghaas; in Sanskrit it is called Vrishchiya shaaka. In Uttarakhand it

is called as Kandali or Kaldiya in the Garhwal region and in the Kumoun region it is known as Shishoon or Shishunu.

The plant is 1 to 2m tall, perennial and is considered as a weed. All the plant parts such as stem, leaves, flowers, seeds and roots are used for various purposes. The plant is easily available in the hilly areas of Uttarakhand. With right condition it can grow easily in plain areas. The leaves and the stems contain tiny hair-like stings which are called trichomes. The trichomes contain histamine and 5-hydroxytryptamine which are responsible for the burning or itching sensation on the skin when the trichomes come in contact with the skin. This burning sensation or itching sensation is called as Contact paresthesia. Due to the presence of trichomes, the handling of the plant is little bit difficult. The plant is beneficial due to the presence of various biologically active compounds or phytochemicals. Due to surplus availability, it is consumed by the local people. There are various recipes that are considered as delicacies by the indigenous people of the hilly areas in Uttarakhand. Some of the most common recipes that are prepared using stinging nettle plant are:

- **Vegetable** - Kandali faanu, kandali saag, kandali dhabri
- **Drink**- Shishunu soup, nettle infusion or decoction, nettle tea
- **Snack**- kandali pakoda and chutney
- **Main course**- nettle stuffed parantha, nettle kaapa

Nutritional aspects of the stinging nettle plant:

The plant is rich in various nutrients and is helpful for the body when consumed in appropriate amounts. It has considerable amount of protein and fatty acids. The fresh leaves of the stinging nettle plant are rich in various amino acids as well as the essential fatty acids such as palmitic acid, linoleic acid and alpha-linolenic acid. The fresh leaves of the plant contain quite a high amount of ascorbic acid. The precursor of the vitamin A i.e. β -carotene is present in good amounts. There are about 9 forms of carotenoids present in the leaves of the stinging nettle. It also consists of various minerals such as potassium,

calcium, magnesium, iron, sodium, manganese, zinc etc. The potassium content of nettle plant is higher than chenopodium and amarathus. There are various bioactive compounds which are present in the plant due to which it is considered of great ethnomedicinal use. It acts as a functional food for many disease conditions. The secondary metabolites that are present in nettle plants are flavonoids (quercetin, kaemferol), phenolic compounds (caffeic acid etc), carotenes (β -carotenes etc), essential oils and fatty acids.

Pharmacological aspects of the stinging nettle plant:

The plants have been traditionally used as a folk-medicine by the indigenous people of the hilly areas in Uttarakhand. All the parts of the plant are used for medicinal purpose. The secondary metabolites or the bioactive compounds present in the plant are used by various pharmacological companies for preparation the preparation of various types of drugs. In Ayurvedic medicines also, the nettle plant holds an important place. The plant is used in various disease conditions such as arthritis, muscular cramping, gout, stomach ache, joint pain, diabetes etc. The plant can be used for curing various Musculo-skeletal ailments. The plant acts as immune-modulatory, analgesic, anti-fungal, anti-bacterial, anthelmintic, anti-cancerous and anti-inflammatory as well. It is also used in curing wound and acnes. It also helps in curing of eczema, a skin disorder. The leaves and roots of the plant are used as blood-purifying agent, emmenagogue (i.e. a substance that stimulates or increase menstrual flow) and diuretic. The infusion made up from the roots of the nettle plant helps in treatment of vaginal discharge, sciatica pain, palsy, internal and external bleeding. The following lines depict various functions of the Himalayan nettle plant and its description:

- **Anti-inflammatory:** The plants have an inhibitory effect on NF-kB activation (nuclear factor kappa B).
- **Anti-arthritis and analgesic:** The plant extracts suppress the cytokine production.
- **Immuno-modulatory:** The nettle plant contains quercetin, kaempherol and other flavonoids that boost the immunity.

- **Anti-diabetic:** The extract of the leaves stimulated the β - cells of islets of Langerhans and helps in production of insulin.
- **Anti-oxidant:** It has free radical scavenging and metal chelating activity. It also helps in inhibiting the peroxidation of the linolenic acid.
- **Anti-viral:** It possesses affinity for the N-acetyl glucosamine region and exhibit better anti-viral activity in case of HIV virus.
- **Anti-bacterial:** It contains a flavonoid named as patulin which inhibits the growth of various bacteria.
- **Hepatoprotective activity:** The plant extract decreases the level of serum alanine transaminase enzyme, decreases aspartate aminotransferase enzyme activity, decreases alanine phosphatase, decreases total bilirubin level and increases activity of superoxide dismutase.

Conclusion

Urtica dioica is an extraordinary plant with great benefits to the human body. Due to its health benefits, it is not only a medicinal plant but also a functional food. Due to the presence of sufficient number of vitamins, minerals, antioxidants etc. and other bioactive compounds the plant is highly nutritive. The plant contains various phytochemicals which can be useful in the development of new drugs. Due to limited availability in other plain regions of Uttarakhand, the plant is considered delicacy. Sensitive handling and pre-processing of the plant make are it difficult to consume it. There is a need to prepare some pre-processed products that can be easily available in the market. Market availability will definitely encourage the people to use it well. Considering all these aspects there is a need to increase the awareness of the people about the nettle plant and motivating the native people to cultivate it. It will ultimately help the farmers economically and to recognize the ancient and traditional practices to be familiar for the welfare of society.
