WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
Coden USA: WJPRAP Impact Factor 8.453
Volume 15, Issue 1, 97-107. Review Article ISSN 2277–7105

RUMEX HASTATUS: FROM NATURAL TO TRADITIONAL MEDICINE

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Article Received on 02 Dec. 2025,
Article Revised on 22 Dec. 2025,
Article Published on 01 Jan. 2026,

https://doi.org/10.5281/zenodo.18092356

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How to cite this Article: [1]*Prakash Kumar, [2]Vikas Negi. (2026). RUMEX HASTATUS: FROM NATURAL TO TRADITIONAL MEDICINE. World Journal of Pharmaceutical Research, 15(1), 97–107.

ABSTRACT

Rumex hastatus D. Don (Polygonaceae), commonly known as Arrowleaf Dock or Khatimal, is a medicinally important Himalayan plant traditionally used for treating fever, cough, headache, tonsillitis, asthma, jaundice, skin infections, and gastrointestinal disorders. The plant is rich in bioactive secondary metabolites including flavonoids, phenolic compounds, anthraquinones (emodin, chrysophanol), quercetin, naphthalenes, and sterols, which contribute to its strong antioxidant, anti-inflammatory, antimicrobial, anticholinesterase, cytotoxic, and neuroprotective activities. Traditional communities in the Himalayan region use its leaves directly on stinging plant injuries, and as a vegetable in routine diet due to its high nutritive and therapeutic potential. Recent pharmacological studies have demonstrated its effectiveness in oxidative stress, neurological disorders, hepatoprotection, anti-diabetic activity, and anti-ulcer properties. Additionally, micropropagation techniques have been developed to ensure sustainable large-scale cultivation, genetic uniformity, and conservation of the species, addressing its increasing demand in herbal, nutraceutical, and pharmaceutical sectors. This review summarizes its ethnomedicinal relevance, phytochemistry, pharmacological properties, and modern cultivation approaches, highlighting its potential as a valuable natural therapeutic resource.

KEYWORDS: Rumex hastatus; Polygonaceae; Ethnomedicinal uses; Phytochemical constituents; Antioxidant activity; Anticholinesterase activity; Neuroprotective effects; Antimicrobial properties; Micropropagation.

INTRODUCTION

Herbal plants are considered the best source for new therapeutic products. According to the WHO (World Health Organization), 65% - 80% of the population of developing countries depends on medicinal plant for basic pharmaceutical care. (Shirwaikar et.al; 2011).

Natural antioxidants are found in green leaf vegetable and fruit, but it has been used a lot, it can help in controlling diseases in the world e.g- Help protect cells from oxidative damage (Sumaira Sahreen et.al; 2011).

Rumex hastatus is a medicinal plant. It is used as herbal remedies. It is also known as Khatimal, belonging to Family-Polygonaceae. It is found in Pakistan, Afghanistan, and China etc (Grinsun Sharma et.al; 2017).

Rumex Hastatus D. Don from the genus Rumex is among 250 species present in the genus. It is referred from varieties of name one of them being commonly known as ***'Toothed Dock'***. Among those 250 species *Rumex Hastatus* has been heavily and primarily used in treatment of disorders like fever, cough, headache, tonsillitis etc. (Neelum Gul Qazi, Fawad Ali Shah et.al; 2022).

The *Rumex hastatus* plant is traditionally known for its anti-inflammatory, antioxidant, antibacterial, and purgative properties. Bioactive compound found such as emodin, chrysophanol, quercetin, kampeferol, and beta resource etc all of these become powerful medicinal resources (Saddaf Rashid et.al; 2023).

Rumex hastatus plant locally used in vegetables in Kashmir, which are found in 8000-12000 feet (Humeera Nisa et.al; 2013).

Both Flavonoids and non-flavonoid phenolic compounds are found in abundance in the plant (Shahidi and Ambigaipalan et.al; 2015).

Rumex hastatus plant composed of 48 genera and 1200 species (Yasmin et.al; 2010).

Fig. 1: *Rumex hastatus* (Polygonaceae).

Characteristics And Classification Of Rumex Hastatus

Rumex hastatus D. Don, commonly known as Arrowleaf Dock or Khatimal, is a bushy shrub belonging to the Polygonaceae family. It is classified as a perennial herb that can grow 30-90 cm tall, with distinctive arrow-shaped (hastate) leaves, small pinkish flowers in clusters, and one-seeded pinkish fruits.(Iflah Hassan, Insha Mushtaq et.al; 2022).

Habitat and Distribution

This plant is native to the Himalayan region, thriving in northern Pakistan, southwest China, and northeast Afghanistan. It is typically found at altitudes of 700-2500 meters on dry slopes, rocks, and wastelands, preferring well-drained sandy, loamy, or clay soils in semi-shade or no shade. (Iflah Hassan, Insha Mushtaq et.al; 2022).

TAXONOMICAL CLASSIFICATION (K Verma, Rupesh K Gautam et.al; 2020)

Kingdom	:	Plantae
Phylum	:	Magnoliophyta
Class	:	Magnoliopsida
Order	:	Polygonaceae
Family	:	Polygonaceae
Genus	:	Rumex
Species	:	*Rumex hastatus*

Synonyms Of *Rumex hastatus* (Almora)

- English : Arrowleaf Dock, Yellow Sock
- Hindi : *Churki*
- Nepal : Kapu
- Punjab : Khattimal
- Urdu : Khatti Buti

Traditional uses in Himalayan region

It is used against stinging plant (Nettle grass found to Himalayan region).When we get contacted bite from stinging plant, we feel burning, itching, or swelling on the skin and rub the fresh leave of *Rumex hastatus* and apply it on affected area.

Traditional and Ethnomedicinal Uses

Rumex hastatus has a wide range of traditional applications. Its roots, leaves, and stems are used to treat ailments including asthma, cough, fever, rheumatism, jaundice, diarrheal, dysentery, toothaches, skin diseases, and even as a remedy for sexually transmitted diseases. It is also consumed as a food, with its sour-tasting leaves eaten raw in salads or chutneys (Iflah Hassan, Insha Mushtaq et.al; 2022).

Collection & Identification of *Rumex Hastatus*

- *Rumex Hastatus* was collected from the Murree Hills in 2008 and identification by Mr. Farrukh Nisar (Department Of Botany, University of Gujrat)
- The *Rumex hastatus* plant was investigated for secondary metabolites and it was concluded that this plant is a rich source of biologically active secondary metabolites. It also has both cytotoxic and anti-urease potential (Nusrat Shafiq et.al; 2017).

Flowering Characteristics

Rumex hastatus has a distinct flowering period that occurs in the late spring, specifically from May to June. During this time, the plant produces numerous small, pinkish flowers arranged in large, branched clusters known as terminal panicles. A key characteristic of its flowers is that they are polygamous, meaning each plant bears flowers with both male and female reproductive organs. The plant primarily relies on wind pollination for fertilization, as its flowers are not designed to attract insect pollinators (Hameed et al; 2010).

Fruiting and Seed Characteristics

Following successful pollination, the plant develops fruit over an exceptionally long season, which can span from March to November. The fruit itself is a pinkish, one-seeded nutlet. Within this fruit lies the seed, a small (about 2 mm), and brown, shiny, and three-angled structure known as an achene. A distinctive feature is that the seed is enclosed by membranous, pinkish, and often heart-shaped valves, which are thought to aid in dispersal. For propagation, *R. hastatus* primarily reproduces via these seeds, which are best sown in the spring (Singh et al; 2014).

Phytochemical Constituents

Phytochemical studies reveal that *R. hastatus* is rich in diverse bioactive compounds. Key constituents include flavonoids (like rutin and luteolin), anthraquinones (such as emodin and physcion), phenolic compounds, naphthalenes, stilbenoids (e.g., resveratrol), and various fatty acid esters and sterols. (Iflah Hassan, Insha Mushtaq et.al; 2022).

How Rumex hastatus is effective in oxidative stress and neurological disorder

This species is traditionally use for the treatment of neurological disorder including headache, migraine, depression, paralysis etc. Because we found strong anticholinestrase and antioxidant activity in it, It should be the remedy for treatment of AD and Neurodegenerative disorder.

Growth & Cultivation Of The Rumex Hastatus: (Tikkam Singh et.al; 2025)

- **Need For The Cultivation**

Rumex hastatus, or arrowleaf dock, is a medicinal herb from the Western Himalayas whose natural population is declining rapidly due to high demand from therapeutic and pharmaceutical industries. This overexploitation has created an urgent need for a reliable cultivation method to meet industrial needs without depleting wild stocks.

- **Laboratory Propagation Method**

To solve the problem of high need of *Rumex Hastatus*, scientists have developed an efficient lab-based propagation technique using a part of the plant called a "nodal explant." This method, known as micropropagation, encourages the direct growth of new shoots. The best results were achieved by placing the node on a Murashige and Skoog (MS) nutrient medium supplemented with a specific concentration of a cytokinin hormone called BAP. This formula successfully produced multiple shoots in all cultures within 30 days.

- **Rooting and Acclimatization**

Once the shoots developed, they were transferred to a medium containing a different type of hormone, an auxin called IBA, to stimulate root growth. A very low concentration of IBA proved most effective, producing an average of over eight strong roots per shoot. After the root system was established, the complete plantlets were carefully hardened and acclimatized to prepare them for survival in greenhouse conditions.

- **Quality and Results of the New Plants**

The regenerated plants were tested for genetic uniformity, showing a 98% similarity to the original mother plant, proving the method produces consistent and true-to-type plants. Interestingly, these lab-grown plants were even found to be more robust, exhibiting higher levels of photosynthetic pigments and enzymatic antioxidants. This protocol provides a reliable system for the large-scale production of *Rumex hastatus*, ensuring its conservation and a continuous supply of raw material for the extraction of valuable bioactive compounds.

Product in Rumex Hastatus

- **Emugel -** This is a herbal emulsifier for the skin, made with Rumex Hastatus root extract for anti-fungal activity.(Manju Koli et.al -2023).

CONCLUSION

Rumex hastatus is a traditionally valued medicinal plant with a broad spectrum of pharmacological activities. Existing literature highlights its significant antioxidants, antimicrobial, anti-inflammatory, analgesic, hepatoprotective and wound healing properties largely attributed to its rich phytochemical profile.

Although preliminary studies support its therapeutic potential, most current findings are limited to in- vitro and very few in-vivo investigations. Comprehensive scientific validation through advanced phytochemical characterization, standardized extraction methods, toxicity profiling and well designed clinical trials is still required.

Overall plant is a promising candidate for the development of novel plant based medicines, but further research is essential to establish its efficacy, safety, and mechanism of action.

ACKNOWLEDGEMENT

I would like to express my deep gratitude and thanks to my supervisor**, Mr. Vikas Negi**,

Assistant Professor, Faculty of Pharmacy, Maharaja Agrasen Himalayan Garhwal University, Pokhra, Pauri Garhwal, 246149, Uttarakhand for his ongoing mentorship and never ending supply of fascinating tasks. I am extremely grateful to him for excellent guidance, critical supervision, keen observation, continuous encouragement and support. One simply could not have a better or friendlier supervisor.

I warmly thank to **Dr. Poonam Rishishwar, Dean, Faculty of Pharmacy, Maharaja Agrasen Himalayan Garhwal University, Pokhra, Pauri Garhwal, 246149, Uttarakhand** for his valuable advice, constructive criticism and her extensive discussions around my work.

I am indeed grateful to my friends and family who have constantly supported me and helped me throughout my project work.

Finally, I am thankful to all those who have helped me directly or indirectly in the successful completion of my thesis. Anyone missed in this acknowledgement are also thanked.

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