

# *Aerva lanata* (Linn.) Juss. ex. Schult as a Complete Plant Drug for Human Health - A Review

Dr. Anilkumar K. K

Assistant Professor and HOD, NSS Hindu College, Changanacherry, Kottayam, Kerala, India Pin: 686102.

**Abstract:** *Aerva lanata*, commonly known as 'Mountain Knotgrass' or 'Khadir' is a versatile plant with a rich history of medicinal applications in traditional and folk medicine systems across various regions. This review aims to provide a comprehensive overview of the medicinal uses of *aerva lanata*, drawing from a wide range of ethnobotanical, phytochemical, and pharmacological studies. *Aerva lanata*, is a resilient, drought-resistant herb found in arid and semi-arid regions of Asia, Africa, and Australia. The plant possesses a wealth of bioactive compounds, including flavonoids, alkaloids, tannins, saponins, and essential oils, which contribute to its medicinal properties. Traditional healers and local communities have utilized *Aerva lanata* for generations to treat a diverse array of health conditions. The therapeutic potential of *Aerva lanata* is diverse and encompasses its application in the management of various ailments, including diabetes, urinary tract infections, gastrointestinal disorders, respiratory problems, skin ailments, and inflammatory conditions. The plant's extracts have exhibited significant antimicrobial, antioxidant, anti-inflammatory, and immunomodulatory properties, which can be attributed to its phytochemical constituents. This review compiles and discusses the scientific evidence supporting the traditional uses of *Aerva lanata* and its potential as a source of new therapeutic agents. It underscores the need for further research, including pharmacological investigations and clinical trials, to validate the safety and efficacy of *Aerva lanata* in modern medicine. As interest in traditional and natural remedies continues to grow, *Aerva lanata* holds promise as a valuable resource for the development of novel pharmaceuticals and dietary supplements.

**Keywords:** *Aerva lanata*, antimicrobial, anti-diabetic, anti-inflammatory

## 1. Introduction

Medicinal plants, often referred to as the herbs or herbal remedies, that played a significant role in human healthcare for millennia. These are plants that have been traditionally and scientifically recognized for their therapeutic properties and the treatment of various ailments. Medicinal plants have been utilized in diverse cultures across the world and continue to be an essential part of complementary and alternative medicine today. The use of medicinal plants is deeply rooted in the history of human civilization. Ancient texts from civilizations like Ayurveda in India, Traditional Chinese Medicine, and Native American healing practices document the knowledge and wisdom of using plants for medicinal purposes. These traditional systems relied on the vast wealth of botanical diversity to address a wide range of health concerns. In modern times, the significance of medicinal plants has not diminished. They have become the basis for the development of pharmaceutical drugs, with many life-saving medications derived from compounds initially identified in plants. Moreover, there is a growing interest in using herbal remedies and natural therapies as a complementary approach to conventional medical treatments, focusing on holistic wellness and prevention. The potential advantages of medicinal plants are numerous. They often have fewer side effects compared to synthetic drugs and can be more accessible and affordable. Additionally, many people find comfort in the idea of using natural remedies to promote health and well-being. However, it is crucial to acknowledge that the use of medicinal plants should be approached with care and knowledge. The potency and safety of plant-based remedies can vary significantly, and interactions with conventional medications can occur. So, care should be taken for the use of medicinal plants in serious health problems. The study of medicinal plants is a dynamic field, with ongoing research aimed at uncovering their therapeutic potential and further

understanding their mechanisms of action. This ongoing exploration of the natural world's healing resources continues to enrich our understanding of the role that medicinal plants play in human healthcare.

*Aerva lanata*, commonly known as Mountain Knotgrass or Kokilaksha is a versatile and medicinal plant that has been valued for its therapeutic properties for centuries. This resilient herb is native to the Indian subcontinent and is a prominent feature in traditional medicine systems, including Ayurveda and Unani medicine. Its diverse range of medicinal uses makes it a subject of interest for both herbal practitioners and modern researchers. *Aerva lanata* is renowned for its efficacy in treating various ailments, owing to its rich phytochemical composition. The plant contains bioactive compounds like flavonoids, alkaloids, tannins, and saponins, which contribute to its medicinal properties. These compounds endow it with anti-inflammatory, antioxidant, antimicrobial, and antidiuretic properties, among others. In traditional medicine, *Aerva lanata* has been used to address a wide array of health issues. Its roots, leaves, and seeds are employed to treat conditions such as urinary tract infections, kidney stones, digestive disorders, and skin ailments. Additionally, it is valued for its potential in managing conditions like diabetes, hypertension, and various respiratory problems. *Aerva lanata*'s antioxidant properties make it beneficial for overall well-being, helping to combat stress in the body. A modern science continues to explore the therapeutic potential of *Aerva lanata*, ongoing research aims to validate and expand upon the traditional uses of this remarkable plant. With its long history of safe and effective use, *Aerva lanata* continues to play a crucial role in the world of herbal medicine, offering hope for those seeking natural remedies for a variety of health concerns.

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**Taxonomic classification**

Kingdom: Plantae  
 Division: Mangnoliophyta (Angiosperms)  
 Class: Magnoliopsida (Dicots)  
 Order: Caryophyllales  
 Family: Amaranthaceae  
 Genus: *Aerva*  
 Species: *lanata*

**Synonym:** *Achyranthes lanata* L, *Achyranthes villosa* Forsk, *Aerva elegans* Mog, *Illecebrum lanatum* L. *Aerva floribunda* wight.

**Vernacular Names**

Language	Name
Bengali	Chaya
English	Erva
Gujarati	Gorakshganjo, Kapuri madhuri
Hindi	Chaya, Gorakabundi, Gorakh ganja
Kannada	Bili, Himdi Shoppu
Malayalam	Cheroola, Cheruvoola, Belipoovu
Marati	Kapurmadhuri
Sanskrit	Bhadrika, Badaram, Astmabayda
Tamil	Poolai, Cirupulai
Telugu	Pindichettu, Kaminpullay, Pinde- conda
Urudu	Bishari booti, Gorakshaganja

**Plant description**

*Aerva lanata*, commonly called as Mountain knotgrass or kokiksha, is a herbaceous plant that belongs to the family Amaranthaceae. It is commonly found in arid and semi-arid regions particularly in the various parts of Asia, Africa, and the Middle East. In appearance, the plant is a small, erect, and bushy plant that typically grows to a height of about 30 to 50cms with multiple slender, branched stems which are erect or creeping to the ground, covered with small grayish green leaves. They are simple, opposite and linear to lance-shaped, usually covered with fine hairs for retaining moisture in arid environments. The flowers are small, inconspicuous and typically white to greenish colored that are arranged in slender spike like clusters on axils. Fruits greenish, roundish, compressed utricle with shining black, kidney shaped seeds. The roots are well developed and are typically of dicot plants.

**Chemical Constituents**

The important bioactive phytochemical compounds found in *Aerva lanata* include flavonoids, alkaloids, tannins, and saponins, that contribute to its medicinal properties. Some of the compounds that reported in this plant are  $\alpha$ -Amyrin, campesterol,  $\beta$ -sitosterol and  $\beta$ -sitosterol palmitate, chrysin, and four flavonoid glycosides.

**Antioxidant Activity**

The whole plant is rich in antioxidants, which can protect the body from oxidative stress and help to prevent cell damage caused by free radicals. In CCl<sub>4</sub> treated experimental rats, to induce hepatotoxicity, the petroleum ether and methanolic extracts of *Aerva lanata* showed significant reduction in the level of lipid peroxidation (Ramachandra et al, 2013; Ramachandra et al, 2012)

**Anti-inflammatory Activity**

The plant has anti-inflammatory properties that may help in reducing inflammation in various parts of the body, particularly in cases of arthritis and joint pain. In laboratory experiments using rat, the benzene and alcoholic extracts of *Aerva lanata* showed anti-inflammatory activity (Vetrichelvan et al, 2000)

**Anti-diabetic Activity**

Some studies suggest that *Aerva lanata* may have potential in managing diabetes by helping to lower blood sugar levels. In streptozotocin induced diabetic rat, the methanolic and aqueous extracts of *Aerva lanata* showed significant anti-diabetic activity (Rajesh et al, 2014; Deshmukh et al, 2008, Pullai and Naidu, Rao et al, 2014)

**Anti-diarrheal Activity**

In addition to treating diarrhea, *Aerva lanata* is also used to manage other gastrointestinal issues, including loose stools. In castor oil, charcoal meal test and PGE<sub>2</sub> induced rats, the alcoholic extracts of the whole plant of *Aerva lanata* showed anti-diarrhoeal effect by reducing gastrointestinal motility and inhibiting the synthesis of prostaglandin. (Sunder et al, 2011)

**Anti-ulcer Activity**

*Aerva lanata* is used to alleviate digestive issues such as indigestion, diarrhea, and dysentery. It can help soothe the gastrointestinal tract and improve bowel movements. Ethanol and other chemicals induced gastric mucosal lesions in rats, the aqueous extracts of this plant showed significant anti-ulcer activity (Indukuri et al, 2013)

**Diuretic Activity**

*Aerva lanata* is known for its diuretic properties and has been traditionally used to treat urinary tract infections. It helps flush out toxins and bacteria from the urinary system. In experimental rats, the ethanolic extracts of *Aerva lanata* showed significant increase in urine volume, urinary sodium, potassium and chloride levels when compared with standard drug. (Herath et al, 2005; Kumar et al, 2005)

**Anti-Urolithiatic Activity**

The herb is believed to have lithotriptic properties, which means it may aid in breaking down kidney stones and assist in their elimination. In artificially induced urolithic rats, aqueous suspension of the aerial parts of *Aerva lanata* showed significant decrease in the enzyme related to stone synthesis and produced cytoprotective mechanism (Soundararajan et al, 2007; Chandirika et al, 2013)

**Anti-helminthic Activity**

The alcoholic and aqueous extracts of *Aerva lanata* showed good anti-helminthic activity against the tape worm (*Taenia solium*) and the earth worm (*Pheretima posthuma*). (Anantha et al, 2010)

**Anti-cancer Activity**

The ethanolic extract of *Aerva lanata* showed significant reduction in tumour nodule formation in B16F-10 melanoma induced metastasis mice in the laboratory conditions (Siveen & Kuttan, 2013, Chauhan and Swapna, 2014)

## 2. Conclusion

*Aerva lanata* also known as Mountain knot grass or kokilaksha is a versatile herb with a rich history of medicinal use in traditional healing systems. Its wide range of therapeutic properties, including diuretic, anti-inflammatory qualities, has made it a valuable asset in addressing various health issues. While the traditional uses of *Aerva lanata* are well-documented and have provided relief to countless individuals over the centuries, ongoing scientific research is shedding more light on its potential benefits. However, it is crucial to note that more rigorous studies are needed to validate and fully understand its effectiveness and safety, particularly in modern medical contexts. As interest in natural and herbal remedies continues to grow, *Aerva lanata* stands as a promising candidate for further exploration and development in the field of complementary and alternative medicine. Its long history of safe use and its diverse array of potential medicinal applications make it an intriguing subject for researchers and health care practitioners alike. Ultimately, *Aerva lanata* serves as a reminder of the rich tradition of botanical remedies and the ongoing quest to unlock the full potential of nature's healing resources.

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