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Review Article

A TRADITIONAL REMEDY REVISITED: *DICHROSTACHYS CINEREA* IN URINARY STONE MANAGEMENT

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ABSTRACT

Urolithiasis, the formation of urinary calculi, is a prevalent condition associated with significant morbidity worldwide. Conventional therapies for urolithiasis, including pharmacological and surgical interventions, there is increasing interest in alternative therapies including herbal medicines. Herbs are used as medicine since time immemorial. Consequently, there is growing interest in exploring natural remedies for effective management. *Dichrostachys cinerea,* a versatile medicinal plant with a broad range of phytochemical constituents, holds potential in this domain due to its anti-inflammatory, antioxidant, and diuretic properties. **Objective:** To evaluate the effect of *Dychrostachys cinerea* in the management of urolithiasis (*Mutrashmari*). **Material And Methods:** Information was accessed by literature searches in different sources including ancient literature, journals, Science Direct, PubMed and Google Scholar. The findings of this review paper highlight *D. Cinerea* as an important component of Indian traditional medicine. **Conclusion:** Our present findings suggest that anti-inflammatory, antioxidant, lithotripsic activity of *D. cinerea* is markedly effective in reduction of size and expulsion of calculus. This abstract explores the mechanistic insights and therapeutic potential of *Dichrostachys cinerea* in urolithiasis, emphasizing its pharmacological attributes and need for further preclinical and clinical studies. If validated, *D. cinerea* could offer a cost effective and natural alternative for preventing and managing urolithiasis, addressing the limitations of current therapeutic approaches.

INTRODUCTION

Urolithiasis denotes stones originating anywhere in the urinary tract including kidneys and bladder[1]. It is a prevalent medical condition caused by the formation of solid deposits in the urinary tract. The most common crystalline materials found in kidney stones are calcium oxalate, calcium phosphate, uric acid, and struvite (magnesium ammonium phosphate). It is not uncommon for a stone to contain more than one crystalline component[2]. Bladder stones form almost exclusively as a result of urinary stasis and recurrent infections due to bladder outlet obstruction or neurogenic bladder[3]. While conventional treatments like surgery and lithotripsy are effective but often have limitations, such as adverse effects and high recurrence rates. So, traditional plants are constantly being evaluated for possible antilithiac[4] activity in a systemic manner.

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AIM AND OBJECTIVE

To study the pharmacological evidence of *Dichrostachys cinerea*.

MATERIAL AND METHOD

This review is based on an extensive survey of literature obtained from various sources, including ancient scriptures, peer-reviewed journals, and electronic databases such as ScienceDirect, PubMed, and Google Scholar. The collected data underscore the importance of *Dichrostachys cinerea* as a valuable plant

in traditional Indian medicine, where it has been widely used for its therapeutic properties.

Plant description:

key identification features[5]: Thorny small tree: flowers in spike with two colored stamens: pod twisted. (Figure 1)

Dichrostachys cinerea (Mimosaceae) is commonly known *as Vidathalan[6]*, sickle bush, or Kalahari Christmas tree. It is a medium sized thorny leguminous shrub occurs in tropical-subtropical regions of India. Previous claims reported that the roots are litholytic[7] and diuretic and are useful in vitiated conditions of *Kapha* and *Vata*. The effect of the ethanolic extract of the root of *Dichrostachys cinerea* (L.) was investigated for its anti-urolithiasis effect at 200mg/kg and 400mg/kg dose levels in male Wistar albino rats[8]. Ethanolic extract of the plant significantly reduced the elevated urinary oxalate, showing a regulatory action on endogenous oxalate synthesis.

It has been traditionally used in various system of medicine for its therapeutic properties. This article explores the potential application of *Dichrostachys cinerea* in the management of urolithiasis.

Dichrostachys cinerea used as phyto therapeutic agent[9]. The root is astringent and used in rheumatism[10], urinary calculi, and renal troubles.

Figure 1: Dichrostachys cinerea

Ayurvedic prospective

Formation of stones in the urinary tract is a global phenomenon and is described in ancient Ayurvedic scriptures as *Mutrasmari*[10] (mutra- urine, *Ashmari* = stone). In Ayurveda*, Ashmari* is one among the disease come under *Astamahagada*[10,11] *Ashmar*i (calculi) comprises of two words, i.e. '*Ashma'* and *'Ari.' 'Ashma'* [12] means a stone and *'Ari'* means enemy. It is a disease of *Mutravahasrotas[13]* (urinary tract) and involves formation of stone, resulting into severe pain as given by enemy[12]. Ayurvedic texts provide a detailed understanding of the pathophysiology[14], prevention and treatment of *Mutrashmari*, emphasizing the use of herbal formulations and therapies. *Dichrostachys cinerea's* properties are align well with the principles used in ayurvedic management of urolithiasis.

Ayurvedic properties[15]

Based on its traditional usage and modern phytochemical understanding *Dichrostachys cinerea* can be corelated with following Ayurvedic concepts:

***Rasa* (taste)**: *Tikta, Kashaya*

***Guna* (qualities)**: *Laghu* (light), *Ruksh*a

Virya- *Ushna*

Vipaka *-Katu*

***Dosh* action**: Balances *Vata* and *Kapha* [11,15] which are commonly vitiated in urolithiasis.

These properties suggest that *Dichrostachys cinerea* could reduce inflammation, prevent stone formation and aid in stone dissolution, aligning with ayurvedic approaches to treating *Mutrashmari*.

Phytochemical composition of *Dichrostachys cinerea* [16]

Phytochemical studies reveal that *D.cinerea* contains various bioactive compounds. The plant's diuretic effects can enhance urinary output, reducing supersaturation of lithogenic ions. Additionally, its antioxidant properties may mitigate oxidative stress-a key contributor to renal injury and stone formation. Preliminary in vitro and in vivo studies indicate promising outcomes, including reduced stone size, decreased renal damage, and normalization of urinary biochemical markers.

This plant is known for its rich phytochemical profile includes:

Flavonoids: Known for their antioxidant and anti-inflammatory properties.

Saponins: Possess diuretic and lithotripsic activities, potentially aiding in dissolution of stones.

Tannins: Have astringent properties and may reduce the risk of stone formation.

Alkaloid: Exhibit analgesic and antimicrobial effects, which could be beneficial in managing urinary tract infection often associated with urolithiasis.

Potential Ayurvedic action of *Dichrostachys cinerea*

***Mutral* (diuretic)**: It promotes urine output, helping flush out small calculi.

***Ashmarighn* (stone dissolving)**: Presence of phytochemical such as saponins and tannins may contribute to breaking down urinary stone.

***Raktashodhaka* (blood purifier)**: Its antioxidant properties help reduce oxidative stress, which is contributing factor in stone formation.

***Shothahar* (anti- inflammatory)**: Anti-inflammatory action can alleviate pain and swelling caused by urinary stones.

Ayurvedic references and application related to its action

1. वेल्लन्तरो रसे पाके तिक्तस्तृष्णा कफापहः ।
   मूत्राघाता अश्मजिद्ग्राही योनिमूत्रानिलार्त्तिजित्॥ (भावप्रकाश) [17]
2. बीरतर्वार्दारित्येष गणो वातविकारनुत् ।
   अश्मरीशर्करा मूत्रकृच्छ्राघातरुजापहः ॥(सु. सू.38) [18]

***Mutral* (Diuretic)**- herbs with *Mutral* properties are emphasize in *Sushruta Samhita, Charak Samhita* and *Bhavprakash* for flushing out toxins and small stone from the urinary system. The diuretic properties of this plant may help prevent stone formation by maintaining urine flow and reducing salt supersaturation.

***Ashmaribhedan* (stone breaking)–** Ayurvedic texts describe stone breaking herbs like *Pashanbheda* (Bergenia ligulata) which dissolve or disintegrate stones.

Dichrostachys cinerea due to its saponins and tannins could be considered a contemporary equivalent.

***Sothhara*[15] (anti-inflammatory)**: the pain and swelling caused by urinary stones align with the inflammatory mechanism explained in Ayurveda as *Shotha.* Anti- inflammatory herbs are prescribed to ease these symptoms.

***Krimighna* (antimicrobial):** urinary tract infections are common complications of *Mutrashmari*. The antimicrobial properties of *Dichrostachys cinerea* are compatible with Ayurvedic approaches to address *Mutrakrichhra* (painful urination due to infection).

CONCLUSION

It holds significant promise as a natural remedy for the management urolithiasis. Though detail description of its action is not mentioned in Ayurvedic text completely, its diuretic, antioxidant, anti-inflammatory and lithotripsic property make it a potential candidate for alternative treatment approaches. while traditional usage and preliminary studies support its efficacy, further scientific research is needed to integrate this plant into mainstream therapeutic practices for the urinary calculi.

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