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ORTHOSIPHON ARISTATUS AS A LINK BETWEEN TRADITIONAL MEDICINE AND HOMOEOPATHY: AN EVIDENCE-BASED REVIEW

Dr. Don J. Scott Berin G. MD(Hom)[1]*, Prof. [Dr.] Arun. T. Pratheesh MD(Hom)[2]

[1]Assistant Professor, Department of Community Medicine, White Memorial Homoeo Medical College and Hospital, Attoor, Veeyanoor, Kanniyakumari Dist., Tamil Nadu, India.

[2]H.O.D. Department of Homoeopathic Pharmacy, White Memorial Homoeo Medical College and Hospital, Attoor, Veeyanoor, Kanniyakumari Dist, Tamil Nadu, India.

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***Corresponding Author**

Dr. Don J. Scott Berin G.

MD(Hom)

Assistant Professor, Department of Community Medicine, White Memorial Homoeo Medical College and Hospital, Attoor, Veeyanoor, Kanniyakumari Dist., Tamil Nadu, India.

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ABSTRACT

Orthosiphon aristatus has long history of medicinal use in Indonesia, Malaysia, Southeast Asia, this plant was initially recorded as a treatment for diabetes, kidney stone and hypertension. In the genus *Orthosiphon* (*Lamiaceae*), *Orthosiphon aristatus*, *Orthosiphon pallidus*, *Orthosiphon thymiflorus*, *Orthosiphon stamineus* are widely used in traditional medicine to prevent different diseases such as diabetes, kidney stone, edema, rheumatism, hepatitis, hypertensive and jaundice. A different variety of phytoconstituents has been isolated from the *Orthosiphon* species which include monoterpenes, diterpenes, triterpenes, saponins, organic acid and flavonoids compound. Antidiabetic, anti-inflammatory, antioxidant, hepatoprotective, analgesic and nephroprotective activities have been reported in the plant extract and phytoconstituents. The use of java tea as a medicinal herb makes it a good potential in pharmaceutical world. Currently, people choose herbal remedies because they are rarely causing side effects and the price is lower than synthetic medicines. However, there are problems in the production of herbal medicines, such as availability and quality of raw materials, materials standardization, quality stability and control that are considered as challenging. Bioactive components contents of medicinal herbs vary widely depends on the species, variety, geographical origin, cultivation, harvesting method, and post-harvest

processing. These variations may cause inconsistency in the efficacy, quality, and safety of the herbal products. Therefore, it is needed a serious control in the determination of specifications and parameters for raw materials. Homoeopathy employs plant-derived substances based on the principle of *similia similibus curentur*. While *Orthosiphon aristatus* is not extensively represented in classical materia medica, it has gained clinical importance due to its specific affinity for the urinary system and supportive role in renal conditions. Its inclusion in practice is largely empirical and pharmacologically supported.

KEYWORDS: Java tea, Orthosiphon, Medicinal values, Antidiuretic, Oedema.

INTRODUCTION

Orthosiphon aristatus (Blume) Miq. also called as cat's whiskers, is an ethnomedicinal perennial herb and belongs to the family Lamiaceae, a native of Indonesia. It is 10-25 cm tall with quadrangular stem, leaves opposite, ovate to rhomboid with terminal inflorescence.[8] The plant is one of the most popular traditional folk medicines extensively used in Southeast Asia for the treatment of wide range of ailments. In Indonesia, leaves are used to treat rheumatism, diabetes mellitus, hypertension, tonsillitis, epilepsy, menstrual disorder, gonorrhoa, syphilis, renal calculi, gallstone, acute and chronic nephritis, gout arthritis, urinary tract, renal diseases, and fever.[9-12] It is also traditionally used to treat edema, eruptive fever, influenza, hepatitis, jaundice, and biliary lithiasis. The medicinal property of the leaves of *O. aristatus* is attributed to the presence of bitter glycoside orthosiphon. *O. aristatus* is patchily distributed and very rare in the field, hence, the conservation of this species is needed to ensure its sustainable utilization. Bioefficacy potential of callus cultures sends a ray of hope for such highly medicinal plants, which if not protected may become extinct in near future. Orthosiphon aristatus (Java tea) is a medicinal herb found throughout South East Asia and is shown to have many health-improving properties, for example, anti-allergic, antihypertensive, anti-inflammatory, diuretic properties. It has been used for many centuries in treating ailments of the kidney, bladder stone, urinary tract infection, liver and bladder problems, diabetes, cholesterol and blood pressure, rheumatism and gout. It also relieves muscle spasms in the walls of the internal organs, making it valuable for gallbladder problems. Java tea is shown to have antimicrobial properties as well; in-vitro tests with aqueous extracts of Java tea leaf showed marked inhibition of both gram-positive and gram-negative bacteria. Doleckova et al. studied the anti-proliferative and antiangiogenic effects of flavone eupatorin and showed that it reduced the number of viable cancer cells to the same

extent as the leaf extract. The ability of eupatorin to nonspecifically inhibit many protein kinases was said to be the probable cause of its cellular effects. Homoeopathy employs plant-derived substances based on the principle of *similia similibus curentur*. While *Orthosiphon aristatus* is not extensively represented in classical materia medica, it has gained clinical importance due to its specific affinity for the urinary system and supportive role in renal conditions. Its inclusion in practice is largely empirical and pharmacologically supported.

Outline

Orthosiphon aristatus (Blume) Miq. (Family Lamiaceae) is a native plant of tropical Asia (Malaysia, Singapore, Indonesia, Thailand, Cambodia, Vietnam, the Philippines, Papua New Guinea), temperate Asia (mainland China and Taiwan) as well as tropical Australia (Queensland). *O. aristatus* is referred to by different vernacular names, which include Java-tea (English), The de Java (France), kumis kucing (Indonesia, Malaysia), misai kucing (Malaysia) and ya nuat maeo (Thailand) (Germplasm Resources Information Network, 2009; Samy *et al*, 2009; Wiart, 2006). Synonyms of the taxon include: *Clerodendranthus spicatus* (Thunb.) C. Y. Wu ex H. W. Li, *Clerodendrum spicatum* Thunb., *Ocimum aristatum* Blume, *Orthosiphon spicatus* (Thunb.) Bak., *Orthosiphon spiralis* (Linn.) Merrill, and *Orthosiphon stamineus* Benth. (Barnes *et al.*, 2007; Germplasm Resources Information Network, 2009; Khare, 2007).

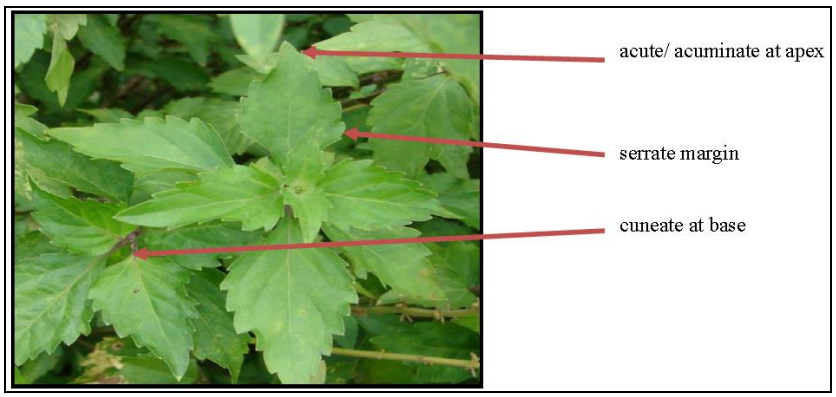
Orthosiphon aristatus throughout this review. *O. aristatus* is a perennial herb that grows in the wild, along forest fringes, but also on wastelands and along roadsides (Samy *et al.*, 2009). Generally, the plant grows to a height of *75* cm. It has a quadrangular, purplish stem. Its leaves are simple, glabrous, lanceolate with serrated margins, and arranged in pairs. The flowers are usually light purple, borne along a maroon terminal raceme. The long protruding stamens give the flower its characteristic resemblance to cat's whiskers.

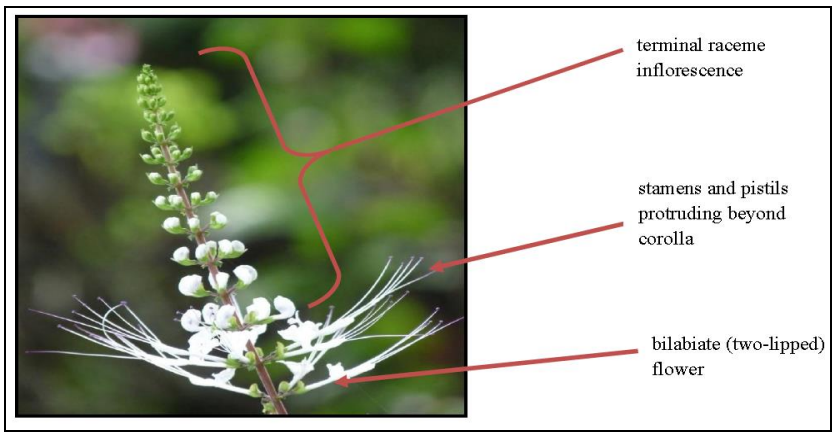
The fruit of the plant is an oblong-ovoid nutlet of 1.5-2 mm in length (Samy *et al.*, 2009). In Malaysia, two varieties of *O. aristatus* can be found. The purple and white *%* varieties can be distinguished by the colour of their corolla and calyx as well as their leaf characteristics (Chan and Loo, 2006). *O. aristatus* is cultivated both as an ornamental plant and a medicinal herb in several tropical countries, including Malaysia and Indonesia (Handa *et al.*, 2006; Musa *et al.*, 2009; Wiart, 2006). In Malaysia, the plant is considered to have great potential for commercialisation (Jaganath and Ng, 2000). *O. aristatus* now appears in many

commercial products in the forms of powdered herb, dried leaves, tea sachets, drinks, extracts, tablets and capsules.

Taxonomic Rank	Classification
Kingdom	Plantae
Class	Magnoliopsida
Phylum	Magnoliophyta
Order	Lamiales
Family	Lamiaceae
Genus	Orthosipho
Species	Orthosiphon aristatus Blume

Despite its widespread and long history of uses as an herbal medicine in different parts of the world, scientific research on the therapeutic potentials of *O. aristatus* only began to intensify over the last ten years or so. At present, the findings in the literature concerning the phytochemical profile and pharmacological properties of the plant have validated to a certain extent some of its purported therapeutic benefits. In this review, we endeavoured to compile an up-to date and comprehensive review of *O. aristatus* that encompasses its traditional uses, phytochemistry and pharmacology.





Traditional Uses

O. aristatus has been utilised in the folk or traditional medicine of Asian cultures for centuries. Besides its principal use as a diuretic, the herb is used as a remedy against renal and urinary disorders as well as various other diseases (Wiart, 2006). In Malaysia, the aerial part of *O. aristatus* is used for controlling high blood pressure, rheumatic fever, gout, arthritis, and diabetes (Khatunei *al.,* 2011). Decoction of the plant is also consumed in Malaysia to eliminate bladder and kidney stones (Samy. ei *al.,* 2009). In Thailand, the plant is used as diuretic and anti-lithiatic agents (Premgamone *et al,* 2001; Woottisin *et al,* 2011) as well as treatment for dysuria (Ngamrojanavanich *et al.,* 2006).

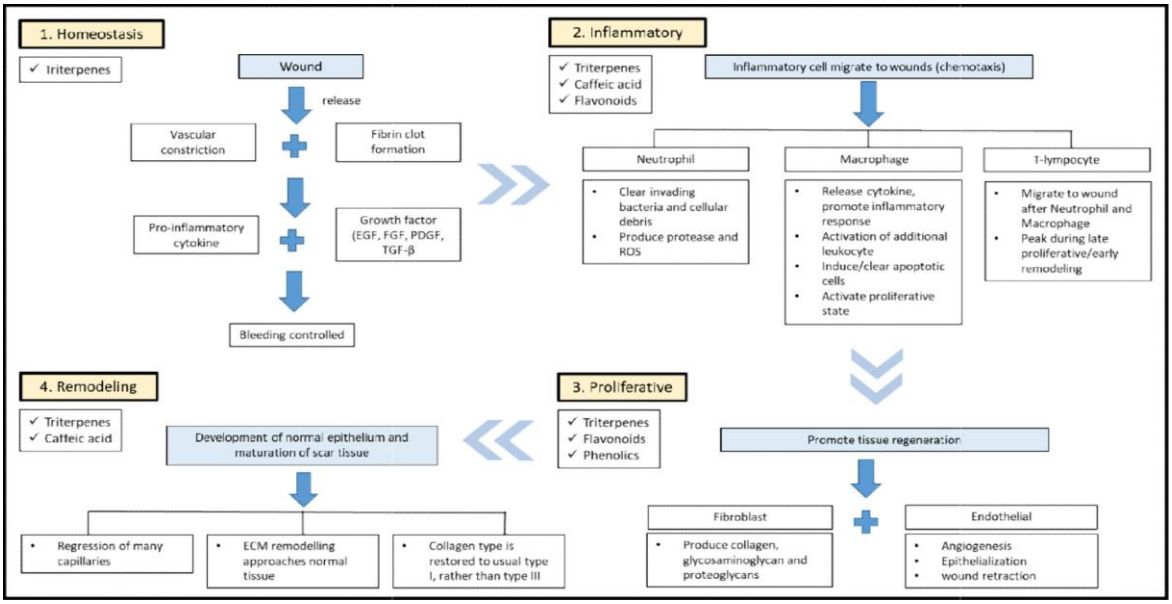
Compound	Class
Sinensetin	Flavonoids
Eupatorin	Flavonoids
3'-Hydroxy-5,6,7,4'- tetramethoxyflavone	Flavonoids
Tetramethylseutellarein	Flavonoids
Salvegenin	Flavonoids
Ladanein, vomifoliolm	Flavonoids
Pillion	Flavonoids
Caffeic acid	Polyphenol
Rosmarinic acid	Polyphenol
Cichoric acid	Polyphenol
Orthosipol A - Z	Diterpene
Staminol A - D	Diterpene
Ursolic acid, oleanolic acid, betulinic aid	Triterpene
Naphtelene	Aromatic hydrocarbon

In Myanmar, the leaves of *O. aristatus* are used to treat diabetes, as well as urinary and renal diseases (Bwin and Gwan, 1967). In Vietnam, the plant is used as a diuretic, as well as treatment for influenza, eruptive fever, rheumatism, hepatitis, jaundice, and biliary lithiasis (Wiart, 2006). In Indonesia, the plant is used with a mixture of other herbs to treat jaundice, diabetes, gout, rheumatism, and arteriosclerosis (Samy *et al.,* 2009). In the Philippines, the leaves of *O. aristatus* are used as diuretic and also as treatments for renal illness, arthritis, gallstones, and diabetes (Eusebio and Umali, 2004), In Taiwan, the herb is used for the treatment of urinary diseases, such as kidney inflammation, kidney stones, and dysuria (Hsu *et al.,* 2010). The Japanese, meanwhile, consume *O. aristatus* tea to facilitate body detoxification (Awale *et al.,* 2003b). In India, the leaves of *O. aristatus* are used as a diuretic in the treatment of nephrosis and severe oedema. Infusion of leaves is also used in the treatment of other kidney and bladder diseases as well as rheumatism and gout (Khare, 2007).

In India, the herb is also used in combination with *Andrographis paniculata* Nees to treat diabetes (Wiart, 2006).

The extract *of O. aristatus* is also a well-recognised traditional herbal medicinal product in a number of European countries, including Germany, France, Spain, and Poland. Europeans consume Java tea, an infusion of the dried leaves, for healthy urinary system, reduction of bacterial infection, and treatment of inflammatory diseases (Committee on Herbal Medicinal Products, 2011; Samy *et ah*, 2009).

Health Problems/ Uses	**Parts of Plant Used/ Preparation**
Kidney and bladder stones	The whole plant
Kidney and bladder diseases, rheumatism, gout	Leaves
Oedema, eruptive fever, influenza, rheumatism, hepatitis, jaundice	Aerial part
Diabetes	Leaves
Hypertension	Leaves
Body detoxification	Leaves
Diuretic agent	Leaves
Antibacterial agent	The whole plant/leaves
Sexual energy booster	Flowers and leaves
Healthy beverage (Java tea)	Leaves/tops of stems



The contribution of phytochemicals in *Orthosiphon aristatus* extract in wound healing. In the homeostasis phase, triterpenes in *O. aristatus* are believed to enhance wound contraction and the rate of epithelialization. The inflammatory phase is overlapping with the proliferative

phase, and thus, triterpenes, flavonoids, and phenolics can be potent radical scavengers to enhance the wound-healing process by inducing cell migration, cell proliferation, and collagen deposition, enhancing the viability of collagen fibrils to increase the strength of collagen fibers and accelerate the process of tissue repair. In the remodeling phase, caffeic acid helps to increase collagen synthesis in fibroblast cells and control melanin production by inhibiting tyrosinase activity.

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Pharmacological Properties of Orthosiphon aristatus (Java Tea / Cat's Whiskers

Orthosiphon aristatus (family: Lamiaceae) is a medicinal plant extensively used in Southeast Asian traditional medicine, especially for renal and metabolic disorders. Its pharmacological

activities are mainly attributed to **flavonoids (sinensetin, eupatorin), phenolic acids (rosmarinic acid), diterpenes, and essential oils**.

1. Diuretic Activity

- One of the **most prominent effects** of the plant
- Increases **glomerular filtration rate (GFR)** and urine volume
- Enhances excretion of **Na^+, K^+, and Cl^- ions** (saluretic effect)
- Mechanism
  - Inhibition of tubular reabsorption of electrolytes
  - Mild vasodilation of renal vessels
- Clinical relevance:
  - Edema, mild hypertension, urinary retention

2. Nephroprotective Activity

- Protects renal tissue from **drug-induced and toxin-induced nephrotoxicity**
- Reduces **oxidative stress markers** (MDA) and increases antioxidant enzymes (SOD, catalase)
- Prevents renal tubular degeneration and interstitial inflammation
- Useful in
  - Chronic kidney disease (supportive)
  - Diabetic nephropathy

3. Anti-urolithiatic (Anti–Kidney Stone) Activity

- Inhibits **crystal nucleation, growth, and aggregation** (especially calcium oxalate stones)
- Promotes dissolution and expulsion of calculi
- Mechanism
  - Increased urine flow
  - Alteration of urinary pH
  - Reduction in oxalate concentration

4. Anti-inflammatory Activity

- Suppresses inflammatory mediators:
  - **Prostaglandins (COX pathway)**
  - Cytokines (TNF-α, IL-1β)

- Active compounds like **rosmarinic acid** inhibit inflammatory signaling
- Applications
  - Arthritis
  - Urinary tract inflammation
  - Renal inflammatory disorders

5. Antioxidant Activity

- Strong free radical scavenging activity
- Neutralizes **reactive oxygen species (ROS)**
- Enhances endogenous antioxidant systems:
  - Superoxide dismutase (SOD)
  - Glutathione peroxidase
- Prevents
  - Lipid peroxidation
  - Cellular and DNA damage

6. Antimicrobial Activity

- Exhibits activity against:
  - Gram-positive bacteria (*Staphylococcus aureus*)
  - Gram-negative bacteria (*E. coli*)
  - Some fungal species
- Mechanism
  - Disruption of microbial cell membranes
  - Inhibition of enzyme systems
- Clinical use
  - Urinary tract infections (adjunct therapy)

7. Antihypertensive Activity

- Produces mild **blood pressure reduction**
- Mechanisms
  - Diuretic effect (reduces plasma volume)
  - Vasodilation via nitric oxide pathways
- Useful in early or mild hypertension

8. Antidiabetic Activity

- Reduces **fasting blood glucose levels**
- Improves **glucose tolerance**
- Mechanism
  - Enhances insulin sensitivity
  - Inhibits intestinal glucose absorption
  - Antioxidant protection of pancreatic β-cells
- Potential role in
  - Type 2 diabetes mellitus

9. Hepatoprotective Activity

- Protects liver from toxins (e.g., paracetamol, alcohol)
- Reduces liver enzymes:
  - ALT, AST, ALP
- Mechanism
  - Antioxidant action
  - Stabilization of hepatocyte membranes

10. Hypolipidemic Activity

- Decreases
  - Total cholesterol
  - LDL (low-density lipoprotein)
  - Triglycerides
- Increases HDL (good cholesterol)
- Supports cardiovascular protection

11. Gastroprotective Activity

- Reduces gastric acid secretion
- Enhances **mucosal defense mechanisms**
- Protects against gastric ulcers
- Mechanism
  - Antioxidant and anti-inflammatory effects

12. Immunomodulatory Activity

- Modulates immune response
- Enhances host defense without excessive inflammation
- Regulates cytokine balance

13. Analgesic Activity

- Mild pain-relieving effect
- Likely due to inhibition of inflammatory mediators

14. Anti-proliferative / Anti-cancer Potential (Emerging Evidence)

- Certain flavonoids (e.g., sinensetin) show:
  - Inhibition of cancer cell proliferation
  - Induction of apoptosis
- Still under experimental research

15. Mechanistic Summary

Major mechanisms include

- **Antioxidant pathways** (ROS scavenging)
- **Anti-inflammatory pathways** (COX, cytokine inhibition)
- **Diuretic and renal modulation**
- **Metabolic regulation** (glucose and lipid metabolism)

CONCLUSION

The present study describes the standardized protocol for callus induction and indirect plant regeneration from the leaves of *O. aristatus*, which may be useful in future research for enhanced production of this valuable medicinal herb and to obtain possible somaclonal variants for its genetic improvement. Depletion of wild population can be prevented through such *in vitro* cultivation for commercial exploitation. NAA and BAP were found to be the most appropriate hormone combination for callusing and multiple shooting. experimental studies says that it is significantly effective in diseases related to gastrointestinal, lungs and liver. Hence the purpose of this review is to provide comprehensive report about the genus based on its toxicity in order to identify its therapeutic potential and further prospects for betterment of research and provides basic knowledge for development of medicinal plants and useful approach for drug discovery. Its wide spectrum of pharmacological actions makes

it highly valuable in **renal diseases, metabolic disorders, cardiovascular conditions, and inflammatory states**. It also holds promising potential for **integrative medicine, phytotherapy, and Homoeopathic research**.

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