



(REVIEW ARTICLE)



Review of a selective *Ayurvedic* formula in the management of *Ashmari* (Urinary stones)

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Abstract

One of the most prevalent illnesses in *Mutravaha Srōtasa* (The bodily channel responsible for urine) is *Mutrāshhari*. *Mutrāshhari* is difficult to treat and requires extra care. *Āchārya Sushruta* listed it as one of the *Ashta Mahāgada* (eight dreadful disorders). It is related to urolithiasis, or urinary calculi in modern medical science. The prevalence of *Mutrāshhari* is rising in the modern day for a number of reasons, including altered eating habits, altered lifestyles, stress as well as strain, and environmental pollution. *Cucumis melo* and *Leea indica* are the chosen herbs in a traditional formula, and this review's goal is to investigate how well those selected herbs manage to treat *Ashmari*. Information about *Ashmari* was acquired from *Ayurvedic* scriptures, contemporary texts, and earlier research studies (from primary and secondary sources). It was thought that two herbs could help with *Ashmari* and afterwards a survey of the literature was done on those two herbs. Also these selected herbs were examined for their *Pancha Padārtha* (5 elements of the herb) and pharmacological qualities. Selected paste shows anti-urolithiatic and anti-hypercalciuric action. According to a literature review and *Pancha Padārtha* analysis, those selected herbs are useful in the treatment of *Ashmari*.

Keywords: *Ashta Mahāgada*; *Mutrā Ashmari*; *Pancha Padārtha*; Urinary calculus

1. Introduction

Urolithiasis is a condition when the kidney, ureter, or bladder appears to have stones (calculi). In Sri Lanka, urolithiasis is a fairly common disease with a high recurrence rate that affects men more than women. Intermittent dull or colicky flank pain, painful or burning urination, cloudy or foul-smelling urine, blood in the urine and nausea/vomiting are all common signs of urolithiasis ^[1]. In the last ten years, there has been a paradigm shift in urolithiasis treatment and the management requires striking a compromise between stone removal morbidity and stone clearance ^[2]. Chemical analysis of stones is helpful since most stones pass spontaneously through the urinary tract ^[3]. Throughout the past few decades, urolithiasis has become more common in both developed and developing nations. The time it takes for urinary calculi to form is unknown, despite the fact that the seasonal variation of stone disease is well established. The date of admission into this region marks the beginning of a time of heightened risk of urinary calculi because southwestern Asia is a location with a high risk of developing stone disease ^[4].

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As per the *Ayurvedic* concept, one of the most frequent disorders where stones grow in the urinary system is *Mutrāshvari*. In Sanskrit, the word "*Ashvari*" refers to the calculus or stone, and the word "*Mutra*" refer to the urine carried by the ureters. *Ashvari* is discussed in *Vruddhatraya* (3 major classics) and *Laghatraya* (3 minor classics), according to Ayurveda. *Charaka Samhitā*, *Susruta Samhitā* and *Ashtāngā Hrdaya Samhitā* (three main classical texts) are examples of *Vruddhatraya*. According to *Charaka Samhitā* calculus forms can be interpreted based on *Dōsha*, for instance, *Kadamba* flowers that stimulate or have a triangular shape are *Vātika*, while smooth, stony *Paittika* and soft because of *Kapha* and semen are *Paittika* [5]. According to the *Susruta Samhitā*, in those who don't frequently practice purification and who engage in bad eating habits and behaviors, *Kapha* predominates in inflamed, combines with urine, and travels to the urinary bladder, where it remains and forms calculi (stones). Fever, bladder pain, taste loss, difficulty urinating, pain in the scrotum, and penis are some of their premonitory signs [6].

These symptoms should be treated with the proper medications [7]. *Ashvari Bhēdana*, *Mutrala*, *Deepana*, *Pāchana*, *Vedanāsthapana* and *Shotahara* are some of the *Ayurvedic* management used to break down the pathogenesis of *Ashvari* [8]. In modern medicine, Alkali and allopurinol are used in the treatment of uric acid nephrolithiasis, thiols and alkali are used to treat cystine nephrolithiasis and dietary and pharmaceutical interventions are used to treat calcium nephrolithiasis. The most often prescribed medications for Calcium-nephrolithiasis are thiazides and alkaline citrate salts because they are effective at preventing new stones [9].

Economically, the rise of urolithiasis contributes to an increase in the cost of healthcare globally. Also, this increase has been linked to a shift in the epidemiology of urolithiasis in terms of the distribution of age and sex as well as the kind and location of calculi [10]. Stone disease is frequently a recurrent problem and more than 50% of patients with a calculus will have formed a further stone or stones within 10 years [11]. The current study based on an *Ayurvedic* medicinal formula that used in kidney. Herbal Paste chosen from a traditional formula which is used in traditional practice, has the following ingredients: *Cucumis melo* and *Leea indica*. The study critically analyzed the pharmacological activities of the ingredients in selected formula in the management of obesity

Aims and objectives

The study was created to determine the anti-urolithiatic activity of the ingredients in selected formula in the management of *Ashvari*. As part of the literature review, this study was created to determine the specific activity of selected herbs in the management of *Ashvari*.

2. Research methodology

The review on *Mutrā Ashvari* was conducted through Ayurveda classical books e.g *Charaka Samhitā*, *Susruta Samhitā*, *Mādhava Nidāna*, *Bhāvaprakāshaya*, *Bhaisajja Ratnāvali*, *Ayurveda Pharmacopiea*. Modern books, Kumar and Clark clinical medicine, Davidson's medicine. Recent scientific explanations and findings which published in official websites and indexed journals, articles and books. The analysis based on pharmacological characteristics *Pancha Padārtha*: *Rasa* (taste), *Guna* (quality), *Veerya* (potency), *Vipāka* (last taste) and *Prabhāva* (specific action). Interpretation of the conversation and result is the last step.

2.1. Review of selected herbs

Herbal paste chosen from a traditional formula (Table 1).

Table 1 Review of selected herbs

Ingredients	<i>Cucumis melo</i>	<i>Leea indica</i>
Family	Cucurbitaceae	Vitaceae
Sanskrit name	<i>Kharbuja</i>	<i>Chatri</i>
Part used	Pulp, roots, seeds and seed oil	Tender leaves

2.1.1. *Cucumis melo* (*Kharbuja*)

Flexuosus, also known as *flexuosus* group or Armenian cucumber, is a frost-sensitive annual vine that bears tendrils. It is farmed for the harvest of its delicious, long and slender, cucumber-like fruits that are eaten as a vegetable. Typically, vines develop to be 6–9' long. This ancestral plant was first grown in western Asia between Armenia and Turkey and

south along the eastern Mediterranean to Egypt in the 1400s. Although technically a muskmelon, this fruit has a cucumber-like appearance and flavor. Yellow flowers with 5-parted corollas bloom for a large portion of the year in regions without frost.

Flavonoids and tannins, two types of polyphenols, were present in *Cucumis melo*. In addition, *Cucumis melo* included amino acids, saponins, and sterols. Seeds from *Cucumis melo* contained phenolic glycosides. The peel of *Cucumis melo* included a variety of substances, including alkaloids, flavonoids, tannins, steroids, saponins, glycosides, and phenols. The seeds of melon include multiflorenol, isomultiflorenol, 24-methylenecycloartenol, α - and β -amyrin, teraxerol, lupeol, euphol, 24-methyl25 (27)-dehydrocycloartenol, 24-methylene-24-dihydrolanosterol, 24-methylene-24-dihydroparkeol, stirucallol and cycloartenol.

Cucumis melo has *Madhura* (sweet) in *Rasa* (taste), *Guru* (heavy), *Snigdha* (unctuous) in *Guna* (quality), *Sheeta* in *Veerya* (cold potency) and balances *Pitta* and *Vāta dōsha*. Hence it is successful in managing *Ashmari* [12]. Its major effects include cytotoxicity as well as nephron protection, anthelmintic also anti-microbial, anti-oxidant as well as anti-hyperlipidemia, anti-hyperglycemic, anti-hypercalciuric, anti-hypothyroidism, gastroprotective, anti-inflammatory, analgesic, diuretic, thyroid stimulatory and analgesic. Ascites, anemia, constipation, diabetes, obesity, leprosy, fever, jaundice, kidney stones, flatulence, and other stomach diseases are among the conditions it is traditionally used to cure [13].

Cucumis melo seed extract added as a supplement showed a regulating effect on endogenous oxalate production by lowering the high urine oxalate levels. The outcomes show that *Cucumis melo* seed possesses anti-urolithiatic activity [14]. The kidney index, urinary calcium and oxalate levels, calcium oxalate deposit numbers, crystal deposit scores, histopathological damages, and inflammation scores were all decreased by the melon and potassium citrate treatments. However, urinary pH, magnesium levels, citrate levels, and the expression of the *UMOD*, *spp1*, and *reg1* genes in the kidney of treated animals were all increased [15]. *Cucumis melo* seed methanolic extract supplementation reduced the elevated renal oxalate, demonstrating a regulatory influence on endogenous oxalate production. According to the Afzal et al (2021) findings, *Cucumis melo* seeds have anti-nephrolithiatic properties [16]. Only the chloroform extract of the *Cucumis melo* peel and pulp shown any anti-urolithiatic efficacy as measured by serum creatinine, uric acid, and BUN levels [17]. The inflammation in urolithiasis, which is a primary factor in kidney stone production and growth, can be considerably reduced by a hydro-ethanolic extract of *Cucumis melo* seed [18].

The current findings suggested that kidney stone elimination could be aided by a hydro-alcoholic extract of *Cucumis melo* fruit skin that reduced crystal size. Hence, it might stop the primary nucleus of kidney stones from forming [19]. With improvements seen in the renal histology profile, seeds of *Cucumis melo* extract had a greater litholytic impact on calcium oxalate kidney stones than allopurinol [20]. The findings partially explain why *Macrotyloma uniflorum* and *Cucumis melo* are used in Indian traditional medicine to treat renal problems [21]. As is clear from the review above, *Cucumis melo* medicines are effective in treating and preventing urolithiasis by breaking up stones, excreting crystals and avoiding their recurrence in the urinary tract [22].

2.1.2. *Leea indica* (Chattri)

Leea indica is a 2–10 m tall shrub, treelet, or small tree with many or single stems, frequently stilt roots, and smooth to pubescent stems. The leaves are 2-3-pinnate, have seven leaflets total, a rachis length of 10–35 cm, and a petiole length of 10–25 cm. The obovate stipules are up to measure 6 cm x 4 cm, early caducous, usually hairless, ovate-oblong to ovate-lance-shaped or elliptical to elliptical-lance-shaped leaflets, with a size of measuring 10-24 cm x 3-12 cm, wedge-shaped base to rounded, acute to acuminate apex, serrate to shallowly dentate margin, with small pearl-glands, inconspicuous and rapidly caduceus.

In addition to eleven hydrocarbons, phthalic acid, palmitic acid, 1-eicosanol, solanesol, farnesol, three phthalic acid esters, gallic acid, lupeol, β -sitosterol, and ursolic acid, *Leea indica* also produced twenty-three other known chemical compounds-they can be mention as Phytochemical screening isolation a novel carotenoid, leeatene, and nine other known compounds including squalene, hexadecanoyl-0-amyrin, vitamin E, 1 - tetratriacontanol, P-amyrin, 3-hydroxy-12-oleanen-28-oic acid, Psitosteryl- P-D-glucopyranoside, 2a,3a,23-trihydroxy-12-oleanen-28-oiacc id and phloridzin.

Leea indica is *Kashāya* (astringent), *Tikta* (bitter) in *Rasa*, *Laghu* (lightness) in *Guna*, *Sheeta* in *Virya* and *Pittahara* action (reduce pitta) [23].

In the ethylene glycol-induced urolithiatic model in rats, *Leea macrophylla* extract reduced and prevented the formation of kidney stones and alleviated renal impairment, suggesting that *Leea indica* species may have demonstrated strong

anti-urolithiatic potential [24]. In the ethylene glycol-induced urolithiasis model in rats, the growth of kidney stones is reported to be significantly reduced as well as prevented by administering the ethanolic extract of the entire plant of *Leea indica* (500 mg/kg orally) to the rats for 14 days. Additionally, the renal impairment is reported to be improved [25]. Krishnaiah et al (2011) study revealed that *Leea indica* has potent anti-urolithiatic action [26]. In Turkish traditional medicine, the fruits of *Leea indica* Mill have been used as a sedative and to cure diabetes, burns, bronchial asthma, constipation, kidney stones, and rheumatic aches [27]. To sum up, research findings from the literature that was accessible suggested that dietary plants and their phytonutrients might be helpful in the treatment and management of urolithiasis [28].

3. Results and Discussion

Mutrā Ashmari is described in various ways by various *Āchāryas*. *Āchārya Bhāvamishra* and *Charaka* mentioned about types of *Ashmari* while *Bhaisajya Ratnavali* and *Susruta Samhitā* contains pathogenesis and signs & symptoms of *Ashmari*. Other signs and symptoms are explained in *Mādhava Nidāna*. Both Ayurveda and modern science described about the management of *Mutrā Ashmari* or urinary calculi [8] [9].

Ashmari is a disease condition with *Kapha* predominant and *Shōshana* of *Kapha* is due to *Tikta*, *Kashāya Rasa* and *Laghu Guna*. Urinary retention is a cause for formation of *Ashmari*. As selected herbs have *Madhura Rasa*, *Sheeta Virya* and *Guru Snigdha Guna* and it gives *Mutrala* action. Due to *Mutrala* action urinary retention reduces and causes the disintegration of Urinary stones. Both herbs are *Sheeta* in *Veerya* which in turn act as alkalizers [8].

The synergetic action of alkalizer is enhanced and appreciating the results in disintegration and elimination of urinary stones from urinary tract. Most of the research articles indicate that both herbs are anti-urolithiatic, anti-nephrothiatic, anti-hypercalciuric and anti-hyperoxaluric. So these properties reduce, dissolve the stones and prevent formation of stones in urinary tract. Both herbs reduce the production of urine oxalate, urine calcium, calcium oxalate, and crystal deposit and potassium citrate levels and hence have anti-urolithiatic activity [14] [15]. Serum creatinine and uric acids are important to measure the efficacy of anti-urolithiatic activity [17]. Hence selected herbs are significant in the management of *Ashmari*.

4. Conclusion

Based on the results, it is reported that selected herbs may treat stone deposition in the kidney by preventing hyperoxaluria. Also those herbs have anti-microbial potential so it may also inhibit the secondary bacterial infection in kidney. Based on the results, it can be concluded that these herb can be used as a potential anti-urolithiatic and anti-hypercalciuric agents for kidney stone removal. *Cucumis melo* and *Leea indica* are useful in the control of *Ashmari* according to the review of the literature and the *Pancha Padārtha* examination. A study of pharmacological effects has revealed that these herbs have strong anti-urolithiatic actions.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

- [1] Shah AB, Mohod P, Deep VC, Sharma GK. Mutrashmari (urolithiasis): A case successfully treated with Gokshuradi Guggulu. International Journal Of Ayurveda And Pharma Research. 2020 Apr 2:76-8.
- [2] Desai J, Zeng G, Zhao Z, Zhong W, Chen W, Wu W. A novel technique of ultra-mini-percutaneous nephrolithotomy: introduction and an initial experience for treatment of upper urinary calculi less than 2 cm. BioMed research international. 2013 Oct, 2013.
- [3] Davidson S. Davidson principles & Practice of Medicine. 21st ed., 2010. p. 474
- [4] Evans K, Costabile RA. Time to development of symptomatic urinary calculi in a high risk environment. The Journal of urology. 2005 Mar, 173(3):858-61.
- [5] Sharma RK. Charaka Samhita, Volume I, Chaukhamba Orientalis, Sanskrit series office: 2005. p. 202-203.

- [6] Sharma PV. *Susruta Samhita, Volume I*, Chaukhamba Orientalis, Varanasi: 2010. p. 483-489.
- [7] Kaviraj SGDS. *Bhaisajya Ratnavali, 1st ed., Volume 2*, Chowkhambhakrinadas Academy, Varanasi, India: 2014. p. 35-45.
- [8] Grover N, Mishra PK, Sharma I, Charan DS. A CASE STUDY ON AYURVEDIC MANAGEMENT OF VRIKKASHMARI. 2021.
- [9] Marangella M. Medical management of urinary calculi: up to date 2016. *Urologia Journal*. 2016 Jul, 83(3):110-23.
- [10] Alatab S, Pourmand G, El Howairis ME, Buchholz N, Najafi I, Pourmand MR, Mashhadi R, Pourmand N. National profiles of urinary calculi (a comparison between developing and developed worlds).
- [11] Kumar P, Clark M. *Clinical medicine*. 7th ed., 2009. p. 625-626.
- [12] *Ayurveda pharmacopeia, Volume I, Part I*, Department of Ayurveda, Colombo, Srilanka: 1976. p. 56.
- [13] Asif HM, Rehman SU, Akram M, Akhtar N, Sultana S, Rehman JU. Medicinal Properties of *Cucumis melo* Linn. *RADS Journal of Pharmacy and Pharmaceutical Sciences*. 2014 Apr 18, 2(1):58-62.
- [14] Patel DM, Patel AB, Patel BR, Patel DR, Patel NK. Evaluation of Efficacy of *Cucumis melo* in Gentamycin and CPD Induced Urolithiasis on Rats. *Journal of Drug Delivery and Therapeutics*. 2021 Feb 26, 11(1-s):113-6.
- [15] Eidi M, Ashjazadeh L. Anti-urolithiatic effect of *Cucumis melo* L. var inodorous in male rats with kidney stones. *Urolithiasis*. 2023 Dec, 51(1):1-9.
- [16] Afzal M, Alharbi KS, Alzarea SI, Quazi AM, Zafar A, Patel DM, Patel AB, Trivedi R, Kazmi I, Al-Abaasi FA. Methanolic extract of *Cucumis melo* attenuates ethylene glycol-induced nephrolithiasis in Wistar rats. *Urolithiasis*. 2021 Aug, 49:301-8.
- [17] Saleem A, Islam M, Saeed H, Iqtedar M. In-vivo Evaluation of Anti-urolithiatic Activity of Different Extracts of Peel and Pulp of *Cucumis melo* L. in Mice Model of Kidney Stone Formation. *Pakistan Journal of Zoology*. 2021 Aug 1, 53(4).
- [18] Shobeiriyani F, Ebrahimi M, Eidi M. Effect of *Cucumis melo* L. seeds extract on renal mRNA levels of Interleukin-10 and Cyclooxygenase-2 in calcium oxalate urolithiasis rats. *Archives of Advances in Biosciences*. 2021 Jan 1, 12(2):47-54.
- [19] Eidi M, Bahar MA, Eidi A, Pouyan O, Shahmohammadi P. Effect of hydro-alcoholic extract of *Cucumis melo* L. fruit skin on prevention of calcium oxalate crystallization in vitro. *Journal of Medicinal Plants*. 2009, 8(32):46-191.
- [20] Suhail B, Zia AE, Alam SS. Effect of *Cucumis melo* Seeds and Allopurinol on Litholytic and Renal Histological Profile in Male Rats. *InProceedings 2020 Dec 3 (Vol. 34, No. 2, pp. 41-46)*.
- [21] Ravishankar K, Priya PS. Evaluation of diuretic effect of ethanolic seed extracts of *Macrotyloma uniflorum* and *Cucumis melo* in rats. *Int J Pharm Bio Sci*. 2012, 3(3):251-5.
- [22] Khan MS, Lari QH, Khan MA. Anti-urolithiatic unani drugs–A review. *life*. 2016 Sep 30, 2:6.
- [23] *Ayurveda pharmacopeia, Volume I, Part I*, Department of Ayurveda, Colombo, Srilanka: 1976. p. 126.
- [24] Hossain F, Mostofa MG, Alam AK. Traditional uses and pharmacological activities of the genus *Leea* and its phytochemicals: a review. *Heliyon*. 2021 Feb 1, 7(2):e06222.
- [25] Nehru A, Shah Y, Sharma J, Shah Y, Thummar P, Verma P, Shah M. A COMPREHENSIVE REVIEW ON THE GENUS *LEEA* (FAMILY *LEEACEAE*) WITH SPECIAL EMPHASIS ON THE INDIAN SPECIES.
- [26] Krishnaiah D, Sarbatly R, Nithyanandam R. A review of the antioxidant potential of medicinal plant species. *Food and bioproducts processing*. 2011 Jul 1, 89(3):217-33.
- [27] Akkol EK, Ilhan M, Karpuz B, Genç Y, Sobarzo-Sánchez E. Sedative and anxiolytic activities of *Opuntia ficus indica* (L.) Mill.: An experimental assessment in mice. *Molecules*. 2020 Apr 16, 25(8):1844.
- [28] Nirumand MC, Hajialyani M, Rahimi R, Farzaei MH, Zingue S, Nabavi SM, Bishayee A. Dietary plants for the prevention and management of kidney stones: preclinical and clinical evidence and molecular mechanisms. *International journal of molecular sciences*. 2018 Mar 7, 19(3):765.