

## SCIENTIFIC LOOK INSIGHT THE AYURVEDIC CLASSICS FOR ANTI UROLITHIATIC PLANTS

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### ABSTRACT

Urinary stone is considered as a surgical condition usually. Despondently, the available modern pharmacotherapies are very costly as well as they are associated with side effects. However, a number of alternative medical managements are available for the urinary stone which are not only break the existed calculi but also prevents its recurrence. Ayurveda, being one of the oldest health care systems offers an effective management of urolithiasis. In Ayurvedic classics urolithiasis is mentioned with the term *Ashmari*. The great Indian surgeon Acharya Sushruta describes all the aspects of *ashmari* in detail including pathogenesis and medical management along with surgical intervention. In the present article an attempt was made to summaries simple and effective single herbal based formulation for the *ashmari* i.e. urinary calculi.

**Key words:** Urinary stone, Ayurveda, *Ashmari*, herbal

### INTRODUCTION

Urolithiasis is the third prevalent disorder of the urinary system after urinary tract infections and benign prostatic hyperplasia. It has afflicted human being since olden times worldwide, sparing no geographical, cultural or racial groups.<sup>1</sup> Urinary stones can persist, with serious medical consequences (such variable degree of pain, hydronephrosis, infection and bleeding), throughout a patient's lifetime.<sup>2</sup> The urinary stone estimated to occur in approximately 12% of the world population<sup>3</sup> and 11% population in India.<sup>1</sup> Men are three times more likely to be affected than women. Different types of calcium oxalate (monohydrate, dehydrate, and basic calcium, phosphate) (70-80%),<sup>4</sup> magnesium ammonium phosphate

(10-15%), uric acid (3-10%) and cystine 0.5-1% contributes in stone.<sup>5</sup> Pathogenesis of urolithiasis is a multifaceted process that includes a series of several physicochemical events, beginning with crystal nucleation, growth and aggregation, and ending with retention within the urinary tract.<sup>6</sup> The mechanisms governing the induction of all of these processes remain speculative. Supersaturation of precipitating salts is the most important contributory factor in the stone formation. One of the most important phenomena that characterize urolithiasis is its high recurrence.<sup>7, 8</sup> Reactive oxygen species (ROS) also seem to be responsible for cellular injury, therefore a reduction of renal oxidative stress could also be an effective

therapeutic approach.<sup>9</sup> Unfortunately, the available therapies thiazide diuretics, alkali-citrate, extracorporeal shock wave lithotripsy and percutaneous nephrolithotomy<sup>10, 11</sup> remain costly and in most cases are invasive with side effects. The side effects may be impairment in renal function, haematuria, hypertension, tubular necrosis or renal fibrosis.<sup>12</sup> Therefore, in recent years researchers looking for phytotherapeutic agents effective in urinary tract stone as an alternative or adjunct therapy.<sup>7</sup> Herbal drug therapy is the most trusted system of medicine in South East Asian countries like India, where plants are a part of culture and life style. A variety of plants were previously investigated for their usefulness in urolithiasis without any adverse effect.<sup>10</sup> So, it is important to find out an alternative approach for the management of urinary stone, therefore phytotherapy is being sought.

#### AIM AND OBJECTIVE

1. Summarize ayurvedic prospective of urinary calculi
2. Compile single drug effective in the urinary calculi treatment

#### AYURVEDIC PROSPECTIVE OF UROLITHIASIS

Ayurveda, the science of traditional Indian medicine has taken its origin long back even before the origin of other contemporary sciences. The searching of the ancient knowledge helps us to build enhanced future. So here an attempt has been made to explore the past literature regarding concept of urolithiasis, which comes under the heading of *Ashmari* (*ashma*- meaning stone).

The *Mutrarogas* (urinary problems) are prevalent since the vedic period and our ancient physicians had detail knowledge about their etipathogenesis and management. *Basti* (urinary system) is the main seat of urinary dis-

order.<sup>13</sup> In classic it is described that *basti* (urinary bladder), *vankshana* (pelvic region), *gavini*, *medra* (penis), *mutravaha dhamanias* (arterial supply of urinary system) all together constitute *mutravaha srotas* (urinary tract).<sup>13, 14</sup> The term *basti* cannot be taken only with reference to urinary bladder, but the entire urinary system has to be taken with reference to the term *basti*. This can be noticed in the description of disease like *mutraghata* (injuries in urinary system), *mutrakrichra* (dysurea) and *prameha* (diabetes).<sup>13</sup> *Ashmari* is included in the *mutravaha sroto vikara* and it is also enumerated as one among the *mahagada* (most serious disease).<sup>13, 15</sup> *Ashmari* merely does not refer the occurrence of stone and its symptom varies from asymptomatic to obstructive uropathy. In *ashmari* vitiated *doshas* solidified to attain the shape of a stone and produce various symptoms.<sup>16</sup> Since it is *krichra sadhya vyadhi* (difficult to cure),<sup>13,14,16</sup> its prevention is always important than its treatment. This is possible only when the cause is established. “*sankshepataha kriya yogo nidana parivarjanam*”.<sup>13</sup> Therefore *nidana parivarjana* (prevention) is mandatory in all forms of *chikitsa* (treatment).

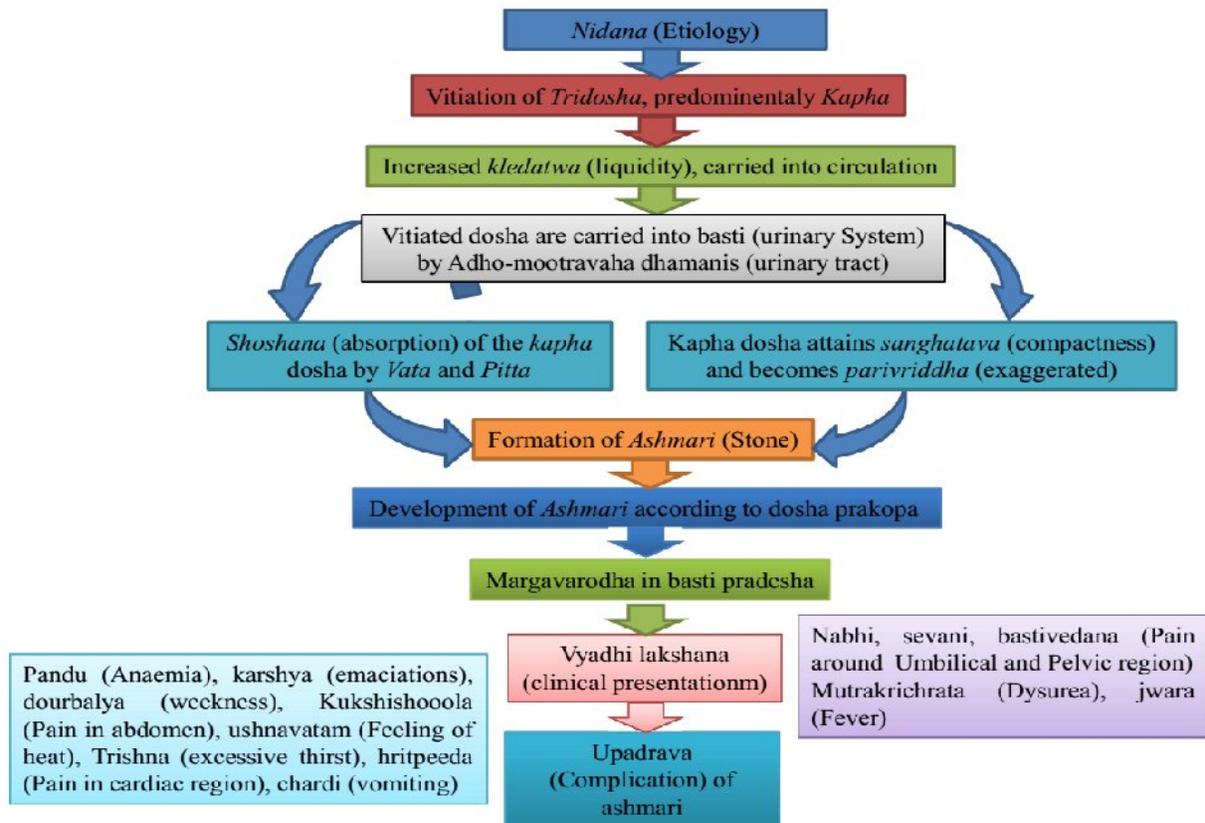
#### SAMPRAPTI (PATHOGENESIS)

The complete course right from indulgence in different *nidana* (etiological factor), vitiation of *doshas* till the manifestation of disease is collectively termed as *Samprapti*. According to *Acharya Charaka*, the *mutra* (urine), *pitta* (the biological fire) and *kapha* ((The water humor or protective humors)) in *basti* when dried up by *vata* (the air or nervous system humor), it results in *mutrashmari* (urinary calculi) in the same way as *gorochana* is formed in *pittashaya* (gall bladder) of cow.<sup>14</sup> While explaining pathophysiology of *ashmari*, Chakrapani explain that all the

ashmari are tridoshaja (*vata*, *pitta* and *kapha*) in origin, as the water present in the atmosphere is dried up by wind and heat, in the same way, *kapha* present in the *basti* is dried up by *vata* and *pitta*.<sup>14</sup>

*Sushruta*, while explaining the *samprapti* of *mutrashmari* says that, by indulging in *nidanans* such as *asamshodhana shilata* and *apathya sevana* (irregular dietary habit) the aggravated *kapha* along with *mutra* forms the *mutrashmari* in the *basti*.<sup>13</sup>

*Vagbhata* while dealing with *samprapti* says the above explanation in slightly different way. He says that the aggravated *vata* covers the *basti mukha* and does the *shoshana* (condensation) of *mutra* associated with *pitta*, *kapha* and *shukra* (semen) and results in the gradual formation of *ashmari* as the muddy deposition takes place even in the pot of clean water. He also says that all the *ashmari* are *shleshmashraya* (Fig. 1).<sup>17</sup>



**Fig. 1. Samprapti of Ashmari (Pathogenesis of Urinary stone)**

**POORVAROOPA (PRODORMAL SYMPTOM)**

*Avila mutrata* (change in character of physical urine i.e. turbidity), *sandra mutrata* (concentrated urine), *bastagandhi mutra* (goat like smelling urine), *basti, muska & asana desha soola* (pain in the lower abdominal region), *mutra krichra* (difficulty in

urination), *aruchi* (loss of appetite) and *jwara* (fever).<sup>13,18,19</sup>

**LAKSHANA (SYMPTOM)**

*Basti, nabhi & mehana vedana* (pain in the lower abdominal region especially bladder, umbilicus, and penis), *mutraarga nirodhana* (obstruction in urinary tract), *muhumuhur-mutrayati* (increase frequency of urination), *srujati alpam alpam* (passes smaller quantity of urine with pain), *kathashchit sampravar-*

tana, bindu bindu sravyapi (passes drop by drop urine), mutradhara sanga or vishirna dhara mutra (disturbance in flow of urine), basti adhma (feeling of bladder fullness), vit sanga (constipation), vrishanayoswayathusarudhira mutra, avila mutrata, shanka churna prakasha, sasikatam mutra (presence of crystals in urine), gomeda sa-

ma mutra (urine similar to gomeda a precious stone). Pain felt in basti pradasha, nabhi and sevani increase by running, walking, traveling and fasting. These activities may dislodge the ashmari causing pain.<sup>13,14,16</sup>

**Table 1. Character of different type of Mutrashmari**

	<b>Vatashmari<sup>13</sup></b>	<b>Pittashmari<sup>13</sup></b>	<b>Kaphashmari<sup>13</sup></b>
Shape & Apperance	<i>Kadamba pushavat kantakachita</i> (looks like flower of <i>Anthocephalus cadamba</i> )	<i>Bhallatakasthi sans-thana</i> (looks like fruit of <i>Semecarpus ana-cardium</i> )	<i>Kukkutanda pratiksha sweta, snigdha</i> (whitish and unctuous like Egg-shell)
Colour	<i>Shyavaruna varna</i> (dark colour)	<i>Madhu varna</i> (colour like honey like)	<i>Mudhuka pushpavarna</i> (colour like flower of <i>Madhuca indica</i> )

**Table 2. Comparison of symptoms**

<b>Ayurveda Parlance</b>	<b>Modern Parlance</b>
<ol style="list-style-type: none"> <li><i>Ruja</i> is the prominent feature</li> <li><i>Basti avatodha</i> is present</li> <li><i>Shyavavarna ashmari</i> with rough, irregular surface with spike and similar to <i>kadamba pushpa</i></li> <li>Shape is similar to that of <i>Bhallataka</i> the colour being red or honey coloured in <i>pittashmari</i></li> <li><i>Kaphaja ashmari</i> is <i>shweta, mahathi</i> and similar to <i>Kukkutanda sama\ Madhuka pushpa</i>.</li> </ol>	<ol style="list-style-type: none"> <li>Pain is the prominent feature</li> <li>Obstruction in the pathway gives raise to intermittent renal colicky pain</li> <li>Calcium oxalate stones are extremely hard with dark colour and spikes</li> <li>Usually non-opaque but when admixture with calcium it becomes opaque, moderate hard having yellow to dark brown colour.</li> <li>Uric acid stones are red, range from yellow to reddish brown and has smooth surface. They are radiolucent.</li> </ol>

**SADHYASADHYATA (PROGNOSIS)**

*Sushruta* says that the newly stones can be managed by conservative methods where as in the vigorous *ashmari* surgical intervention is necessary. *Ashmari* is considered as *asadhya* if it is associated with *upadravas* like *vrishana shotha, baddha mutra*, presence of *sikata* (crystal) and *sharkara* (gravels) in *mutra* which may result in immediate death.<sup>13</sup>

**MANAGEMENT**

According to *Acharya Sushruta*, there are four basic management strategies are described for the *ashmari viz. Aushadha* (Pharmacological measure), *Uttara Basti Karma, Kshara* (alkaline drug treatment) and *Shastra Chikitsa* (surgery).<sup>20</sup> The main *dosha* involve in formation of *Ashmari* is *Kapha*. Therefore, treatment measure which pacify *Kapha dosha* are helpful in *Ashmari*. If, *Ashmari* was formed due to *kapha shoshana*, the line of treatment contains drugs

having *laghu* (light) and *snigdha* (unctuous) properties. While, when *ashmari* was formed due to *kapha sanghatana* then the line of management should include drugs having *laghu* (light), *ruksha* (ruksha) *gunas* (properties) for smoothen the progress of the breakdown of the Urinary calculi.<sup>13, 17, 21</sup>

Natural medicines are widely used by the people in developing countries. According to WHO 80% of the world population used the medicinal plants for their health related problems due to its safety and easy availability. However the availability of treatment modalities in remote areas is still a challenge before the health organizations. Therefore it is necessary to explore the ancient knowledge regarding an efficient, inexpensive, easily obtainable and acceptable medication. Several attempts were made previously to evaluate the plant origin drugs for their effectiveness in urinary calculi.<sup>22-25</sup> In the present study, an attempt was made to assemble the treatment strategies for *ashmari* involve single drug or simple formulation from the *Ayurvedic* treatises.

#### Single Drug Therapy for Urolithiasis

- An alkali of Patala (*Stereospermum suaveolens* DC.) and Karvira (*Nerium indicum* Mill.) with sheep urine is useful in gravels.<sup>13</sup>
- Karkota root (*Momordica dioica* Roxb.) taken with milk for ten days breaks and expels calculi and gravels.<sup>26</sup>
- Kutaja (*Holarrhena antidysenterica* (Linn.) Wall.) bark taken with curd and on wholesome diet expels gravels through urethra.<sup>27</sup>
- The Juice of Kushmanda (*Benincasa hispida* (Thunb.) Cogn.) along with yavakshara (Mixture of potassium salts) and jaggery alleviate retention of urine, gravels and calculus.<sup>28</sup>
- Decoction of kshirivriksha [Ashvattha (*Ficus religiosa* Linn.), Plaksha (*Ficus lacor* Buch. - Ham.), Udumbara (*Ficus racemosa* Linn.), Vata (*Ficus benghalensis* Linn.) and Parishha (*Thespesia papulnea* Soland. Ex. Correa)] given as urethral douche expels the calculus and also blood clot from the bladder.<sup>13</sup>
- Decoction of gokshur (*Tribulus terrestris* Linn.) seeds along with yavakshara (Mixture of potassium salts) alleviates dysurea, gravels and calculus.<sup>27, 28</sup>
- Ghrita cooked with decoction of gokshur (*Tribulus terrestris* Linn.) and eight times milk are effective in calculus.<sup>14</sup>
- Roots of gokshur (*Tribulus terrestris* Linn.), kokilaksha (*Asteracantha longifolia* Nees.), eranda (*Ricinus communis* Linn.), brihati (*Solanum indicum* Linn.) and kantakari (*Solanum surattense* Burm. f.) are pounded together with milk and dissolved in sweet curd, breaks calculus in a seven days use.<sup>14</sup>
- Powder of the seeds of gokshur (*Tribulus terrestris* Linn.) mixed with honey and taken with sheep milk, breaks calculus in a week.<sup>13</sup>
- Powder of the seeds of gokshur (*Tribulus terrestris* Linn.) mixed with svarn makshika and taken with buffalos milk breaks calculus.<sup>29</sup>
- Roots of jati (*Jasminum officinale* L.) taken out in summer, cooked in goat milk and mixed with sugar. Its intakes relive pain due to retention of urine and expel calculus.<sup>30</sup>
- Punarnava (*Boerhaavia diffusa* Linn.), aguru (*Aquilaria agallocha* Roxb.), haridra (*Curcuma longa* Linn.), gokshur (*Tribulus terrestris* Linn.), leaves of kakodumbara (*Ficus hispida* Linn.) and flowers of darbha (*Imperata cylindrica* Beauv.) pounded with milk,

water, wine and sugarcane juice is effective in calculus and gravels.<sup>14</sup>

- Regular use of seeds of trapus (*Cucumis sativus* Linn.) or flower of coconut (*Cocos nucifera* Linn.) with milk alleviates gravels within a few days.<sup>27</sup>
- Regular use of nala (*Arundo donax* Linn.), pasanbheda (*Bergenia ligulata* (Wall.) Engle.), darbha (*Imperata cylindrica* Beauv.), ikshu (*Saccharum officinarum* Linn.) and seeds of trapus (*Cucumis sativus* Linn.) and ervaru (*Cucumis utilissimus*) boiled in milk and added with ghee are effective in calculus.<sup>14</sup>
- Milk cooked with triphala [powder of three fruits viz. Haritaki (*Terminalia chebula* Retz.), Bibhitaki (*Terminalia bellirica* Roxb) and Amalaki (*Emblica officinalis* Gaertn. in equal quantity] or punarnava (*Boerhaavia diffusa* Linn.) are effective in calculus.<sup>13</sup>
- Pounded Seeds of bibhitaka (*Terminalia bellirica* Roxb) taken with urine, removes defects of urine and destroys calculus.<sup>13</sup>
- Roots of mayurshikha (*Actiniopteris dichotoma* Bedd.) are taken with rice water and on diet of milk and cereals alleviate calculus.<sup>17</sup>
- Intake of the root of matulunga with stale water removes pain caused by gravels.<sup>29</sup>
- Ghee cooked with kusha (*Desmostachya bipinnata* Stapf.), Kasa (*Saccharum spontaneum* Linn.), shara (*Saccharum munja* Roxb.), morata (*Maerua arenaria* Hook. F. & Th.) Pasanbheda (*Bergenia ligulata* (Wall.) Engle.) etc. is efficacious in calculus caused by pitta.<sup>13</sup>
- Vandaka (*Loranthus longiflorus* Desr.), syonaka (*Oroxylum indicum* Vent.) and varuna (*Crataeva nurvala* Buch. -Ham.) break the calculus especially caused by vata.<sup>13</sup>
- Decoction of varuna bark (*Crataeva nurvala* Buch. -Ham.), sunthi (*Zingiber officinale* Rosc.) and gokshur (*Tribulus terrestris* Linn.) mixed with yavakshara (Mixture of potassium salts) and jaggery destroys calculus caused by vata.<sup>28, 31</sup>
- Decoction made of varuna bark (*Crataeva nurvala* Buch.-Ham.), pasanbheda (*Bergenia ligulata* (Wall.) Engle.), sunthi (*Zingiber officinale* Rosc.) and gokshur (*Tribulus terrestris* Linn.) added with yavakshara (Mixture of potassium salts) disintegrates gravels.<sup>28, 31</sup>
- Regular use of decoction of varuna root barks (*Crataeva nurvala* Buch. -Ham.) added with its paste, fells calculus.<sup>28, 32</sup>
- Use of decoction of Varuna root barks (*Crataeva nurvala* Buch. -Ham.) mixed with jaggery, expels calculus and alleviates pain in pelvis.<sup>28</sup>
- Use of soup made of the paste of shigru (*Moringa oleifera* Lam.) root fried in ghee and oil, curd-scum and salt is effective in calculus.<sup>14,16</sup>
- By taking haridra (*Curcuma longa* Linn.) and jaggery in equal parts with sour gruels gravels pass away.<sup>33</sup>
- Decoction of Varun (*Crataeva nurvala* Buch. -Ham.) and Shigru stem bark (*Moringa oleifera* Lam.) is effective in stone and pain induce by stone.<sup>31</sup>
- Early morning intake of decoction of gokshur (*Tribulus terrestris* Linn.), erand (*Ricinus communis* Linn.) leaf and Varun bark (*Crataeva nurvala* Buch. -Ham.) destroys calculus.<sup>31</sup>
- Intake of gokshur (*Tribulus terrestris* Linn.) seed along with honey and goat milk destroys calculus in a week.<sup>31</sup>
- Early morning use of overnight soaking musali (*Asparagus adscendens* Roxb.) churn

and endrayan root (*Trichosanthes tricuspidata* Lour.) churn destroys calculus in three days.<sup>31</sup>

- Early morning use of coconut flower (*Cocos nucifera* Linn.) with yavakshara (Mixture of potassium salts) destroys stone.<sup>31</sup>
- Paste of ginger (*Zingiber officinale* Rosc.), haritaki (*Terminalia chebula* Retz.), kaliyaka (*Coscinium fenestratum* Colebr.) and yavakshara (Mixture of potassium salts) added with dadhimanda destroys calculus quickly.<sup>27</sup>
- Use of decoction of Varun stems bark (*Crataeva nurvala* Buch. -Ham.) along with jiggery destroys calculus quickly.<sup>28</sup>
- Use of honey added with gokshur (*Tribulus terrestris* Linn.) seed along with milk of sheep destroys calculus in a week.<sup>28</sup>
- Decoction of pasanbheda (*Bergenia ligulata* (Wall.) Engle.) added with shilajatu and sugar destroys calculus caused by pitta.<sup>34</sup>
- Regular use of kutaja (*Holarrhena antidy-senterica* (Linn.) Wall.) bark along with curd destroys gravels of penis.<sup>34</sup>
- Regular use of paste made up of kutaja (*Holarrhena antidy-senterica* (Linn.) Wall.) root and cow's curd destroys calculus.<sup>34</sup>
- Use of purified shilajatu along with honey is effective in calculus.<sup>34</sup>
- Early morning use of paste of arkapuspi (*Holostemma annulare* (Roxb.) K. Schum.) with cow milk destroys ashmari.<sup>34</sup>

## DISCUSSION

In pathogenesis of urinary calculi all the three *doshas* are involve with predominance of kapha. Pain or dysuria is contributed by

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vitiated *vata* moreover vitiating *pitta* is responsible for the conditions like burning micturition or haematuria.<sup>35</sup> Therefore the drugs possess its action on urinary system acts as urinary antiseptic, diuretic, antimicrobial or anti-inflammatory are useful in management of stone. Varuna, goksharu, punarnava and shigru are frequently used to cure urinary stone. These drugs possess all the properties which can split the stone and expel out through urine.<sup>23</sup> *Ushna virya* and *lekhana* property of Bibhitaka, Shilajit, jaggary etc. are also helpful in *kapha dosha* and disintegration of stone. Drugs having *Madhura vipaka* and *ushna virya* like shunthi, haritaki etc. are pacify the vitiating *vata dosha* and reduces symptoms of calculi. Drugs like pashanbheda, gokshuru, kushmanda, dhanyaka exerts *mutrala* (diuretic) effect by virtue of their *sita virya*. The *mutrala* action helps in the removal of morbid *pitta dosha*, which causes clinical features like burning micturition. Thus, the individual drugs mentioned in ayurvedic classics have capacity of *samprapti vighnana* (to break up the pathogenesis of the disease) through diverse mechanism of actions.<sup>36</sup>

## CONCLUSION

Being one of the *ashtamahagada*, early and effective management of *ashmari* is very important. The plant drugs are usually free from any toxic effect and thus can be given in Urolithiasis. It is hoped that the present article will be helpful to ayurvedic and traditional practitioners and be beneficial to the mankind.

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