

# The Magic of Herbal Remedies in Kidney Stone - A Review Article

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## ARTICLE DETAILS

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## ABSTRACT

Kidney stones are the third most common urinary tract problems after urinary tract infections and prostate pathology with high recurrence. Kidney stones may cause extreme pain and blockage of urine flow. The problem of urinary stones or calculi is a very ancient one and many remedies have been employed during the ages these stones are found in all parts of the urinary tract, the kidney, the ureters and the urinary bladder and may vary considerably in size. They are usually treated with medications that may cause a number of side-effects. overuse of synthetic drugs, which results in higher incidence of adverse drug reactions, has motivated humans to return to nature for safe remedies. Medicinal herbs are used in different cultures as a reliable source of natural remedies. Herbs and herbal drugs have created interest among the people by its clinically proven effects. A total of 503 species, 365 genera and 119 families were cited for treating kidney stones. The most common used plant parts are root and rhizome (25%), mode of preparation decoction (62%) and route of administration is oral in all cases. The aim of this review is to provide a comprehensive information about traditionally used antiuro lithiatic plants and Polyhebal formulation present in market having scientifically proved pharmacological activities like analgesic, anti-inflammatory, antioxidant, astringent, demulcent, diuretic, litholytic, lithotriptic, antiuro lithiatic, antispasmodic, ACE inhibition and Phospholipase A2 inhibition as a plausible mechanism of action. Alternative to synthetic agents, many herbal plant's with antiuro lithiatic activity are known from across world. This review focuses on kidney stone with all related information and plants Species and polyherbal formulations used for the treatment of kidney stone. The purpose of this paper is to critically review available literature on herbal medicines and their possible role in the management of urolithiasis.

## 1. Introduction

The roots of modern science and history of urinary stone disease go back to the *Ancient Egyptians* and *Mesopotamia*. *Hippocrates* defined the symptoms of bladder stones. The first recorded details of "*perineal lithotomy*" were those of *Cornelius Celsus*. The first recorded suprapubic lithotomy was carried out by *Pierre Franco* in 1561<sup>[1]</sup>. However, with the introduction of the first extracorporeal shock wave machine in 1980, a dramatic change in stone management was observed<sup>[2]</sup>. The descriptions of "cutting for the stone" are found in Hindu and

Greek writings. *Sushruta* the author of the book *Sushruta Samhita* (around 600 BC) was a surgeon who lived in ancient India, in book he describes over 300 surgical procedures, including perineal lithotomy<sup>[2,3]</sup>. The development of urinary calculi or kidney stones is known as urolithiasis or nephrolithiasis. It is considered one of the most painful conditions known to man<sup>[4]</sup>. Globally, kidney stone disease prevalence and recurrence rates are increasing<sup>[5,6]</sup>, with limited options of effective drugs. Urolithiasis affects about 12% of the world population at some stage in their lifetime<sup>[5,7]</sup>.

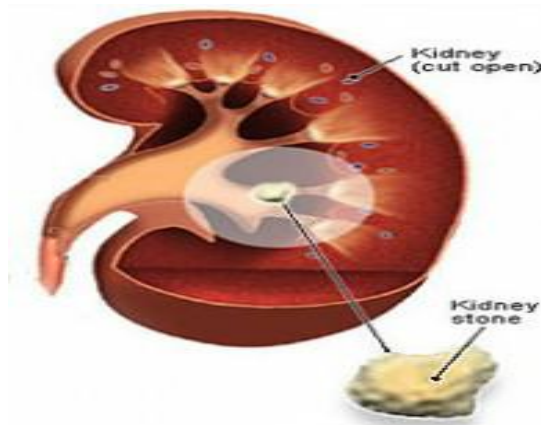


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Kidney stone disease typically presents between the ages of 20 and 60 and is more prevalent in hot climates. In Indian population, about 72,000 are expected to have urinary stones every year and out of which 50% may end up with loss of kidney functions<sup>[8]</sup>.

## 2. Types Of Stones:

### Calcium-containing stones

Population - 80%, Colour - Black/Dark brown/Dirty White.

The most common type of kidney stone is Calcium Containing stone. It contains calcium oxalate either alone or in combination with calcium phosphate in the form of apatite or brushite<sup>[9][10]</sup>. Factors that promote the precipitation of oxalate crystals in the urine, such as primary hyperoxaluria, are associated with the development of calcium oxalate stones<sup>[12]</sup>. conditions such as hyperparathyroidism<sup>[11]</sup> and renal tubular acidosis<sup>[13]</sup>. leads to formation of calcium phosphate stones.

Oxaluria is increased in patients with certain gastrointestinal disorders including inflammatory bowel disease such as Crohn's disease.

### Struvite stones

Population - 10-15 %, Colour -/ Dirty White.

In certain types of urinary tract infections in which bacteria make ammonia that builds up in your urine it may lead to Struvite stones (also known as "infection stones," urease, or triple-phosphate stones). It is made up of magnesium, ammonium and phosphate  $\text{NH}_4\text{MgPO}_4 \cdot 6\text{H}_2\text{O}$ . About 10–15% of urinary calculi are composed of struvite<sup>[14]</sup>. Using the enzyme urease, these organisms metabolize urea into ammonia and carbon dioxide. This alkalizes the urine, resulting in favorable conditions for the formation of struvite stones. Struvite stone is found mostly in women with urinary tract infections (UTIs).

### Cystine Stones

Population - 1-2 %, Colour- Red / Yellow.

The name "cystine" comes from its original description as "bladder calculi" in 1833. These stones tend to form only in both men and women who have the genetic disorder cystinuria, an autosomal recessive disorder. Cystine stones are rare. With this type of stone, cystine — an acid that occurs naturally in the body — leaks from the kidneys into the urine. Cystine stones are made of a chemical cystine. They also face a greater risk of eventual kidney damage and chronic renal failure compared to calcium nephrolithiasis patients<sup>[15][16][18]</sup>.

### Uric acid stones

Population -5–10 %<sup>[18]</sup>, Colour - Yellow/Reddish brown

Uric acid stone is the second most-common cause of urinary stones after calcium oxalate and calcium phosphate calculi. People with certain metabolic abnormalities, obesity<sup>[17]</sup> may produce uric acid stones. The most important risk factor for uric acid crystallization and stone formation is a low urine pH (below 5.5) rather than an increased urinary uric acid excretion<sup>[19]</sup>. They also may form in association with conditions that cause hyperuricosuria (an excessive amount of uric acid in the urine) with or without hyperuricemia (an excessive amount of uric acid in the serum).

## 3. Pathophysiology of Kidney Stone:

Kidney Stones growth starts with the formation of crystals in supersaturated urine which then adhere to the urothelium, thus creating the nidus for subsequent stone growth. The biological processes that anchor crystals to the urothelium are incompletely understood. Many, but not all, calcium oxalate stones develop on Randall's plaques which are composed of calcium phosphate (= hydroxyapatite) crystals.

More recent theories focus on the role of cell surface molecules which favour or inhibit crystal adhesion<sup>[20][21]</sup>. Urothelial injury and repair after a stone episode may increase surface expression of these molecules to favour further crystal adhesion.

### Supersaturation of urine

When the urine becomes supersaturated (when the urine solvent contains more solutes than it can hold in solution) with one or more calculogenic (crystal-forming) substances, a seed crystal may form through the process of nucleation<sup>[22]</sup>.

### Hypocitraturia

Hypocitraturia or low urinary-citrate excretion (defined as less than 320 mg/day) can cause kidney stones in up to 2/3 of cases.<sup>[23]</sup>

### Inhibitors of stone formation

Citrate an chelating agent present in normal urine, that inhibit the nucleation, growth, and aggregation of calcium-containing crystals. Other endogenous inhibitors include calgranulin (an S-100 calcium-binding protein), Tamm–Horsfall protein, glycosaminoglycans, uropontin (a form of osteopontin), nephrocalcin (an acidic glycoprotein), prothrombin F1 peptide, and bikunin (uronic acid-rich protein). The biochemical mechanisms of action of these substances have not yet been thoroughly elucidated. However, when these substances fall below their normal proportions, stones can form from an aggregation of crystals<sup>[24]</sup>.

## 4. Symptoms of Kidney Stone

For a very small kidney stone that moves easily through your urinary tract, it may not have any symptoms, and may never know that you had a kidney stone.

For larger kidney stone, you may notice any of the following symptoms:<sup>[25]</sup>

- Severe pain in the side and back, below the ribs
- Pain that radiates to the lower abdomen and groin
- Pain that comes in waves and fluctuates in intensity
- Pain on urination
- Pink, red or brown urine
- Cloudy or foul-smelling urine
- Nausea and vomiting
- Persistent need to urinate
- Urinating more often than usual
- Fever and chills if an infection is present
- Urinating small amounts

## 5. Diagnosis of Kidney Stone

### Laboratory diagnosis

Laboratory diagnosis includes stone analysis, imaging studies, blood profiles, and a urine metabolic evaluation. Stone analysis plays a valuable role in the diagnosis of kidney stone patients, specifically in infrequently encountered kidney stones such as UA, cystine, infection-induced, drug-induced, and NH<sub>4</sub><sup>+</sup> urate stones. Imaging studies are valuable in the diagnosis of kidney stone disease<sup>[27]</sup>.

- **Blood testing**- Blood tests may reveal too much calcium or uric acid in blood. Blood other medical conditions.
- **Urine testing**-The 24-hour urine collection test may show that Patient excreting too many stone-forming minerals or too few stone-preventing substances. For this test, doctor may request to perform two urine collections over two consecutive days for patients.
- **Imaging**-Imaging tests may show kidney stones in urinary tract. Options range from simple abdominal X-rays, which can miss small kidney stones, to high-speed or dual energy computerized tomography (CT) that may reveal even tiny stones.
- **Analysis of passed stones**-Lab analysis will reveal the makeup of kidney stones. doctor uses this information to determine what's causing kidney stones and to form a plan to prevent more kidney stones. test results help monitor the health of kidney.
- **Urinary supersaturation**-The utility of urinary supersaturation measurement as a surrogate of kidney stone incidence has not been fully studied. To date, only a single study has provided evidence that a reduction in CaOx supersaturation is associated with a fall in stone incidence.
- **Metabolic Prevention**-A simplified metabolic evaluation starts with a random 24-h urinary profile . In some optional instances, 2-h fasting urinary calcium:creatinine ratio (Ca:Cr) and fasting urinary phosphorus are obtained to establish the diagnosis of renal leak calcium, excessive calcium mobilization from bone, and renal phosphorus leak<sup>[29]</sup>.

## 6. Prevention of Kidney Stones

- Plenty of fluids
- Don't eat food that are rich in oxalate, like walnuts, spinach and chocolate
- Eat less animal protein, such as meat and eggs
- Stick to a low-salt diet
- Get enough but not too much calcium, for example in the form of milk, cheese or yogurt Research shows that a low-calcium diet tends to increase the risk of kidney stones<sup>[30]</sup>.

## 7. Dietary supplements and kidney stones

**Pyridoxin (Vitamin- B-6)** – a dose of 50-100 mg per day of B-6 helps prevent formation of calcium oxalate stones<sup>[31]</sup>

**Calcium** – (about 1,000 to 1,200 milligrams per day).

**Flavonoids** – two common flavonoids, catechin and epicatechin, strongly decreased calcium deposition in rat kidneys. This substances contain antioxidant activity<sup>[32]</sup>

**L-Arginine** – oral L-Arginine increases urinary citrate and decreases urinary calcium oxalate in animal studies<sup>[33]</sup> It prevented renal epithelial damage and protein oxidation in the test animals.

**Magnesium** – men who consumed higher levels of dietary or supplemental magnesium had reduced risk of developing kidney stones<sup>[34]</sup>. Magnesium decreases oxalate absorption and urinary excretion (DaSavaraj, et al, 2007; Marz, 1999). The usual dose of magnesium for stone prevention is 400-600 mg per day. Potassium citrate – oral potassium citrate supplementation has been shown to help prevent kidney stone formation.

**Vitamin C** – high levels of vitamin C (1,000 mg per day), was associated with a greater risk of developing kidney stones than in men who took low levels of vitamin C<sup>[34]</sup>

**Vitamin D** – High doses of this important vitamin have been linked to increased formation of calcium kidney stones in people with hyper-parathyroidism.

**Vitamin E** – in animal studies vitamin E inhibited calcium oxalate crystal formation<sup>[35]</sup>. In human epidemiological studies low levels of vitamin E were associated with a higher risk of stone formation.

**Vitamin K** – people with higher amounts of vitamin K have a lower incidence of kidney stones. **Vitamin K** was found to inhibit calcium oxalate formation. A dose of 2 mg per day is desirable.

## 8. Pharmacological Treatment -

Pharmacological treatment is needed in most recurrent calcium kidney stone formers as well as in specific stone-forming populations such as UA, cystine and infection-induced stones due to the lack of availability and/or consensus regarding the effectiveness of dietary restrictions<sup>[36]</sup>

### a)Thiazide diuretic treatment -

**Drugs Used** -Hydrochlorothiazide, Chlorthalidone, Trichlormethiazide, Bendroflumethiazide, Potassium citrate, Thiazide diuretics and their analogs are commonly used medical treatments for lowering calcium excretion in recurrent calcium stone formers<sup>[37]</sup>. In several randomized controlled trials, thiazide diuretics were effective in significantly reducing kidney stone recurrence<sup>[37-41]</sup>. These results were consistent with a number of open studies showing reduced kidney stone formation with thiazides<sup>[42-47]</sup>. Thiazides are effective in treating hypercalciuria and reducing stone recurrences<sup>[48]</sup>. The optimal effect of thiazides is achieved with a low-salt diet.

### b)Alkali treatment -

**Drug Used** - Potassium citrate and Thiazide in combination

In alkali treatment Potassium Citrate either alone or in combination with thiazide treatment in recurrent calcium or UA stone formers<sup>[49,50]</sup>. Alkali treatment is effective in lowering urinary calcium excretion, raising urinary citrate, and reducing urinary CaOx, CaP, and undissociated UA supersaturation<sup>[51]</sup>

### c) Allopurinol treatment -

Allopurinol reduces the frequency of stone formation in hyperuricosuric patients with recurrent uric acid stones. In a randomized controlled trial in hyperuricosuric calcium stone formers, treatment with allopurinol was shown to reduce urinary UA excretion as well as stone recurrence<sup>[52]</sup>. Allopurinol is mostly used to prevent uric acid stones. But its effectiveness has only been studied in people with calcium stones. Those

studies showed that allopurinol can prevent calcium stones: Without allopurinol, 55 out of 100 people had another kidney stone within three and a half years, combined thiazide and allopurinol treatment is more effective in reducing stone events compared with either treatment alone<sup>[53]</sup>

#### d) Other drug treatment for stone prevention

**DrugUsed** - tamsulosin, nifedipine, Acetohydroxamic acid, Captopril, Penicillamine

The use of medications to speed the spontaneous passage of stones in the ureter is referred to as medical expulsive therapy<sup>[54][55]</sup>. Several agents, including alpha adrenergic blocker and calcium channel blockers may be effective<sup>[54]</sup>. Alpha-blockers appear to be more effective for larger stones (over 5 mm in size) than smaller stones<sup>[55]</sup>. A combination of tamsulosin and a corticosteroid may be better than tamsulosin alone<sup>[54]</sup>. Acetohydroxamic acid is the only drug approved for the treatment of infectious kidney stones. Captopril is an ACE inhibitor clinical effectiveness in cystinuric stone.

#### 9. Limitations of Pharmacological Treatment

- The association between thiazide use and glucose intolerance has been known for many years<sup>[39,40]</sup>. Recent retrospective meta-analysis of all clinical trials conducted between 1966 and 2004 in thiazide-treated populations, an inverse relationship was shown between changes in serum glucose and potassium concentrations<sup>[56]</sup>.
- the incorrect perception that kidney stone disease is a self-limiting local disorder without consideration for chronic, recurrent, and systemic illnesses
- An incomplete understanding of the pathophysiologic and molecular genetic basis of nephrolithiasis. The misconception that kidney stone disease is a self-limiting disorder hinders nephrologists and urologists in the prevention of recurrent kidney stone disease, indirectly impeding the development of new drugs<sup>[57]</sup>.

#### 10. Herbal Treatment For Kidney Stone -

Many herbs in TCM, Ayurveda, Native American medicine, Eclectic/Physiomedical medicine and European traditions have a long history of being used to help deal with kidney stones and urinary calculi. Some are reputed to "dissolve" stones (this is unlikely), some help relax the ureters helping stones to pass and others are useful for relieving pain and spasm caused by passing stones. Some herbs seem to possess all of these activities while others are used in formulas.

##### 1. Couch grass rhizome (*Elymus repens*) –

**Family** - Poaceae

**Common Names** - couch, twitch, quick grass, quitch grass (also just quitch), dog grass, quackgrass, scutch grass, and witchgrass is a soothing diuretic that can be useful as part of a formula to make passing stones easier<sup>[58]</sup>. It also promotes uric acid excretion, so can help prevent uric acid stones.

**Dose:** Tea: 2-3 tsp. dried rhizome, 12 oz. water, decoct 30 minutes, steep 1/2 hour, take 1 cup 3x/day Tincture: (1:4 or 1:5, 1:2.5): 3-5 ml (60-100 gtt) TID/QID

##### 2. Golden rod herb (*Solidago* spp.) –

**Family** – Asteraceae

**Common Names** - Goldrute, woundwort, Aaron's rod, and solidago.

herbalists in the UK often use Solidago with Pellitory-of-the-Wall or Parsley © Martin Wall Panax quinquefolius (American ginseng) Aesculus hippocastanum (horse chestnut) 67 Volume 10 Number 2 Journal of the American Herbalists Guild J A H G Piert for helping to pass kidney stones.<sup>[59]</sup> Britishherbalis Christopher Hedley, AHG, says that he has seen this simple formula "cause stones to vanish". The patients never noticed the stone passing and upon a follow up ultrasound they had disappeared.

**Dose:** Tea : 1-2 tsp. dried herb, 8 oz. hot water, steep covered, 20-30 minutes, take 2 cups/day Tincture (1:5): 2-3 ml (40-60 gtt.) TID/QID

##### 3. Yucca root (*Yucca* spp.) –

**family** -Asparagaceae

**Common Names** - amole, soapweed, soapwell.

Alabama herbalist Phyllis Light, RH (AHG) uses Yucca root to help ease passage of kidney stones and relieve urinary tract pain<sup>[60]</sup>

**Dose:** Tea: 1 tsp. dried root, 10 oz. water, decoct 15 minutes, steep 20 minutes, take 4 oz. TID Tincture: 1-2 ml (20-40 gtt.) TID

##### 4. Wild Carrot seed (*Daucus carota*) –

**Family:** Apiaceae

**Other Names** - wild carrot, bird's nest, bishop's lace, Queen Anne's lace

British herbalist Anne McIntyre FNIMH uses Wild Carrot seed along with Parsley Piert (*Alchemilla arvensis*) for helping to expel kidney stones<sup>[61]</sup>

**Dose:** Tincture (1:5): 5 mls. TID -2.5 mls. (50 gtt) of each

##### 5. Varuna bark (*Crateva nurvala*) –

**family** -Capparaceae

**Common Names** - Cratevalophosperma Kurz, *Crateva religiosa* var. *nurvula*

this Ayurvedic herb is used to help prevent kidney stones and is also used with banana stem (*Musa paradisiaca*) for successfully treating kidney stone.<sup>[62]</sup> the authors state that this formula "helped to dissolve renal calculi, facilitated their passage and reduced pain."

**Dose:** Tea: 2 tsp. dried bark, 12 oz. water, decoct 15 minutes, steep 1/2 hour. Take 8 oz. 2-3 times per day Tincture (1:5): 4-5 ml (80-100 gtt.) TID

##### 6. Punarnava herb (*Boerhaaviadiffusa*) –

**Family** – Nyctaginaceae

**Common Names** - red spiderling, spreading hogweed, tarvine, punarnava

this common Indian weed is used as a kidney restorative and to help expel kidney stones. In an in vitro study it was able to inhibit formation of struvite stones; whether it can do this in vivo is unknown<sup>[63]</sup>

**Dose:** Powder: 1/2 - 1 tsp. TID

##### 7. Pellitory of the Wall herb (*Parietariadiffusa*) -

**Family:** Urticaceae

**Common Names** - spreading pellitory , pellitory of the wall, sticky-weed , asthma weed

is used in the UK as a diuretic, kidney trophorestorative and to help pass urinary calculi and stones. It is often combined with Goldenrod, Parsley or Parsley Piert to help prevent stones or assist in their passage.<sup>[64]</sup>

**Dose:** Tea: 1-2 tsp. dried herb, 8 oz. hot water, steep 30 minutes, take 4 oz. TID Tincture (1:5): 1.5-2 ml (30-40 gtt.) QID

### 8. Marshmallow root (*Althea officinalis*) –

**Family:** Malvaceae

**Common Names** - Marshmallow, Gulkhairo , Althaea, is the most soothing and mucilaginous herbal diuretic.<sup>[65]</sup> Consuming large quantities of the tea can help ease passage of urinary stones and relieve inflammation and tissue damage.

**Dose:** Tea: 1-2 tsp. dried herb, 8 oz. hot water, steep covered 20 minutes, take 4-8 oz. TID

### 9. Khella seed (*Ammi visnaga*) –

**Family** – Apiaceae

**common names** - toothpick-plant, toothpickweed, bisnaga, khella, or sometimes Bishop's weed.

this northern Africa plant is an effective antispasmodic, useful for relieving spasm and pain in the urinary tract, gall bladder, respiratory tract and cardiovascular system. Khella is very useful as part of a protocol for helping to pass urinary calculi.<sup>[66]</sup>

**Dose:** Tea: 1 tsp. dried seeds, 8 oz. hot water, steep covered 30 minutes, take 4 oz. TID Tincture (1:5): 1-2 ml TID

### 10. Kava root (*Piper methysticum*) –

**Family:** Piperaceae

**Common names** - 'awa (Hawai'i), 'ava (Samoa), yaqona (Fiji), sakau (Pohnpei), (Kosrae), and malok or malogu (parts of Vanuatu).<sup>[67]</sup>

was introduced to western medical practice by the British explorer Captain Cook. In the U.S., the Eclectic physicians primarily used it for urinary tract pain. It helps relax the ureters, allowing stones to pass more easily and diminishes colicky, spasmodic pain

**Dose:** Tea (Decoction): 1-2 tsp. dried root, 8 oz. water, decoct 15 minutes, steep 1 hour, then blend. Take 4 oz. QID Tincture (1:4, 1:5): 2-4 ml (40-80 gtt.) TID/ QID Capsules: Standardized (60 mg. Kava lactones) - 2-4/day

### 11. Jin Qian Cao herbs (*Desmodium styracifolium*) –

**family** - Fabaceae,

**Common names** - tick-trefoil, tick clover, hitch hikers or beggar lice.<sup>[d11]</sup>

are three herbs known as Jin Qian Cao. Of the three, *Desmodium* and *Glechoma longituba* are believed to be more effective for helping to pass kidney stones. *Lysmachia* (also known as Jin Qian Cao) is believed by some practitioners to be more useful for treating gallstones, but it is also commonly used in formulas for helping to pass kidney stones.<sup>[68]</sup>

**Dose:** Tea: 2-3 tsp. dried herb, 8 oz. hot water, steep 40 minutes. Take 2-4 cups per day

### 12. Hydrangea root bark (*Hydrangea arborescens*) –

**Family** -Hydrangeaceae

**Common names** - smooth hydrangea, wild hydrangea, or sevenbark

This native American shrub is one of the most effective urinary tract analgesics. It is indicated for genito-urinary tract pain and spasm and I use it with Khella, Lobelia, Kava, Horse Chestnut, and Yucca root for acute pain caused by kidney stones.<sup>[69]</sup>

**Dose:** Tea: ½ - 1 tsp. dried bark, 8 oz. cool water, steep 1 hour. Take 4 oz. TID Tincture (1:5): 2-3 ml TID

### 13. Horsetail herb (*Equisetum arvense*) –

**Family:** Equisetaceae

**Common Names** -common horsetail , this herb is rich in silicic acid and helps strengthen bones, teeth, hair, skin and nails. It also helps speed healing of minor kidney damage and hematuria caused by passing stones. In the UK, Horsetail has the reputation of promoting expulsion urinary calculi.<sup>[70]</sup>

**Dose:** Tea: 1 tsp. dried herb, 8 oz. water, decoct 15 minutes, steep 1 hour, take 4 oz. 3x/day Tincture (1:5): 1-2 ml (20-40 gtt.) TID

### 14. Gravel root (*Eupatorium purpureum*) –

**Family** - Asteraceae

**Common Name** - purple Joe-Pye weed, kidney-root, sweetscented joe pye weed, sweet Joe-Pye weed

also known as Queen of the Meadow, has a long history of use for helping to make passing stones easier. It also helps relieve kidney and genito-urinary tract pain. This herb has been found to contain unsaturated pyrrolizidine alkaloids which are potentially hepatotoxic. It is unclear whether the levels found in this root are problematic. Since no one seems to have a definitive answer, I would advise short-term usage for Gravel root.<sup>[71]</sup>

**Dose:** Tea: 1 tsp. dried root, 8 oz. water, decoct 15 minutes, steep 45 minutes, take 2 cups/day Tincture: 1.5-2 ml (30-40 gtt.) TID

### 15. Horse Chestnut seed (*Aesculus hippocastanum*) –

**family**-Sapindaceae.

**Common Names** - horse-chestnut ,conker tree

the specific indications for *Aesculus* are for throbbing pain with edema and inflammation. It is most often used for hemorrhoids, varicose veins and trauma injuries. The analgesic and antiinflammatory effects also help with the tensive pain caused by kidney stones and reduce swelling of the ureter, thus allowing stones to pass more easily.<sup>[72]</sup>

**Dose:** Tincture (1:2): .25-.75 ml (5-15 gtt.) TID Capsules: A standardized product (16-20% Escin) has been used in several studies with a dose of 300 mg. of the extract every 12 hours

Kidney Stone PolyHerbal Formulations used in India		
Name	Company	Ingredients
Cystone	Himalaya	Shilapushpa – DidymocarpusPedicellata ,Pasanabheda (Ciliata) – Bergenia Ligulata , Manjishtha – RubiaCordifolia , Nagarmotha – CyperusScariosus ,Apamarga – Achyranthes Aspera , Gojha – OnosmaBracteatum , Sahadevi – Vernonia Cinerea , HajrulYahoodBhasma – Lime Silicate Calx , Shilajit – Asphaltum
StonDab	Dabour	Varuna ,RaktaPunarnava , Guduchi , Apamarga , Pashanbheda
Punarnavarist	Baidyanath	Sveta Punarnava[BoerhaviaVerticillata] , RaktaPunarnava[BoerhaviaDiffusa], Bala[SidaCordifolia] , Atibala[AbulitonIndicum] , Patha[CissampelosParieta] , Vasa[AdhatodaVasica] , Guduchi[TinosporaCordifolia] , Chitraka [Plumbago Zeylanica], Nidigdihika[Solanum Surattense]
Neeri	Aimil Pharmaceuticals	Daruharidra (Berberis aristata DC.), Punarnava (Boerhaviadiffusa L.), Palash (Butea monosperma), Varun (Crataevanurvala ), Sahdevi (Vernonia cinerea), Apamarga (Achyranthes aspera L.), Gokhru (Tribulus terrestris L), ShilajeetSudh (Purified Black Bitumen), Lajjalu (Mimosa pudica L.), Yavakshar (Hordeum vulgare), Sheetal Chini (Piper cubeba), SaindhaNamak (Sodiichloridum ), Ikshu (Saccharum officinarum L.), Kultha (Macrotylomauniflorum (Lam.) Verdc), Makoya (Solanum nigrum L), Chharilla (Parmeliaperlata), SamunderNamak (Powder) (Sea Salt), Aak (Calotropis procera,(Aiton) Dryand
Stonvil		Achyranthes Aspera, Chandraprabha, Chitraka, Commiphora Mukul, DagdiBherBhasma, GymnemaSylvestre, Punarnava, SaxifragaLigulata, Shilajit and Tribulus Terrestris
DivyaAshmamarihar Ras	Patanjali	Yavkshar ,HazrulYahoodBhasma , Mulikshar , KalmiShora ,SwetParpati
StoneKrush	KIVA PHARMA	Kulthi ,Patherber , IlechiBadi ,Jawakhar , ShudhShilajeet , HazralYahudBhasam

## 11. Conclusion

Urinary stones affect 10–12% of the population in industrialized countries. The incidence of urinary stones has been increasing over the last years while the age of onset is decreasing. With a prevalence of > 10% and an expected recurrence rate of ~ 50%, stone disease has an important effect on the healthcare system. Urolithiasis is a major health problem with high recurrence rate, complex pathophysiology and multifactorial etiology.

The effects of various plants with proposed application to prevent and treat stone kidney formation have been critically reviewed in the present article. The need is to develop an effective, safe and standardized herbal preparation for the management of urolithiasis. The majority of these antiurolithiatic plants or herbal formulations found to either dissolve the stones or inhibit the process of urinary stone formation. However, little is known about safety and efficacy most of these plants or herbal formulations as antiurolithiatic agents.

Despite considerable improvements in the development of new therapies for the management of urinary stones, the incidence of urolithiasis is increasing worldwide. Besides a number of therapies are available for urolithiasis none of

them is 100% effective and similarly the medicinal plants with less side effects and cost effective are used in different ways and theories for the production and course of urolithiasis. Currently known herbal drugs exert their antiurolithiatic effect with multidimensional pharmacological actions. Although these herbal medicines are popular in folk culture but rationale behind their efficacy and safety are not well established. The understandings of the pathophysiology of stone formation and the mode of action of these plant based medicines are of great importance for the development of safe and effective antiurolithiatic.

Systematic research needs to be undertaken, in an attempt to explore botanicals as alternative and/or complementary medicines for the treatment of urolithiasis.

In conclusion, more interdisciplinary research between pharmacognosists, pharmacologist and clinical investigators is needed to develop new plant-derived high-quality natural products to treat and prevent the formation of kidney stones.

Furthermore, understanding the underlying pathophysiology, pathogenesis, and genetic basis of kidney stone formation will hopefully lead to discover novel drugs and strategies to manage urolithiasis in the near future.

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