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Review Article

AN OVERVIEW ON POTENT INDIGENOUS HERBS FOR URINARY TRACT INFIRMITY: UROLITHIASIS

ANAND TIWARI*, VIVEK SONI, VIKAS LONDHE, ASHISH BHANDARKAR, DEEPTI BANDAWANE, SONALI NIPATE

Modern College Of Pharmacy, Sec-21, Yamuna Nagar, Nigdi, Pune-44, Maharastra, India, E Mail: ahpharma11@gmail.com

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ABSTRACT

Medicinal plants have been known for millennia and are highly esteemed all over the world as a rich source of therapeutic agents for the prevention of various ailments. Urolithiasis is the condition where urinary calculi are formed in the urinary tract. It is a common disorder estimated to occur in approximately 12% of the population, with a recurrence rate of 70-81% in males, and 47-60% in females. It causes serious health problems such as severe pain, urinary-tract obstruction and infection that adversely affect well-being of individuals. Treatment option includes shock wave lithotripsy (SWL), ureteroscopy, percutaneous nephrostolithotomy (PCNL), and open or laproscopic stone removal which are costly and painful. Many synthetic drugs like diuretics and narcotic analgesics are being used in treatment of kidney stone but overuse of synthetic drugs, which results in higher incidence of adverse drug reactions have motivated humans to return to nature for safe remedies**.** As herbs and herbal drugs have clinically proven effects like immunomodulation, adaptogenic and antimutagenic, they play a vital role in treatment of kidney stone disease. Number of medicinal plants shows antiurolithiatic activity such as Kanghi (*Abuliton indicum*), Chaya (*Aerva lanta*), Bishkapa or purnava (*Boerhaavia diffusa*), Ajuba (*Bryophyllum pinnatum*), Gokhuru (*Tribulus terrestis*), Makka (*Zea mays*) etc.In the present article, an attempt has been made to emphasize on potent indigenous herbs used in treatment of urolithiasis.

Keywords: Urolithiasis, Adaptogenic , Antimutagenic, , Percutaneous nephrostolithotomy

INTRODUCTION

Urolithiasis (nephrolithiasis) or kidney stone is formation of urinary calculi at any level of urinary tract. It is estimated that 12% of world population experiences renal stone disease with a recurrence rate of 70-80% in male and 47-60% in female [1, 2] Urinary calculi are the third most common affliction of the urinary tract which are exceeded by the urinary tract infections and prostate diseases.[3]

Renal calculi can be broadly classified in two large groups: tissue attached and unattached. Attached calculi are mainly integrated by calcium oxalate monohydrate (COM) renal calculi, with a detectable attachment site to the renal papilla and basically consisting of a core located near to the attachment site (concave zone) and radially striated concentrically laminated peripheral layers. Unattached calculi, with no detectable site of attachment to papilla, are developed in renal cavities of low or reduced urodynamic efficacy and can exhibit diverse composition and structures[4,5] Several reports have been published since Randall's first description of papillary calcifications and their possible active role in the genesis of COM papillary calculi[6,7].

Physicians usually do not treat kidney stone they just medicate the pain until the stones pass out their own. Vegetarian diet, heavy on herbs and liquids, can be helpful in the prevention and treatment of kidney stone. So the best way to prevent kidney stone is to drink plenty of water and take a vegetarian diet high in magnesium. The standard drugs used to prevent urolithiasis are not effective in all patients, and many of them have adverse effects that compromise their long term use. The present day management of urolithiasis with open renal surgery is unusual and rarely used only since the introduction of Extracorporeal Shock Wave Lithotripsy (ESWL) which has almost become the standard procedure for eliminating kidney stones. However, in addition to the traumatic effect of shockwaves, persistent residue stone fragments and the possibility of infection suggests that ESWL may cause acute renal injury, a decrease in renal function and an increase in stone recurrence. Hence the search for antilithiatic drugs to be effective without side effects from natural sources has gained great potential. In the present article, an attempt has been made to emphasize on potent herb used in treatment for urinary stone.

Herbs and herbal drugs have created interest among the people by its clinically proven effects like immunomodulation, adaptogenic and antimutagenic. Also, the overuse of synthetic drugs, which results in higher incidence of adverse drug reactions, has motivated humans to return to nature for safe remedies. The origins, according to many,can be sourced to the World Health Organization's Canberre conference in 1976, which promoted the concept of 'Traditional' medicines for the developing countries. 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. Diet containing low amounts of inferior quality proteins and high intake of animal proteins might augment the risk of stone formation. The incidence of urolithiasis is very common in Northern India compared to southern state. It is speculated that higher incidence may be due to wheat diets. People living in rocky areas, where the climate is hot and dry, seem to be more to urinary calculi disease [8]

KIDNEY STONE FORMATION

Kidney stone formation or urolithiasis is a complex process that occurs due to imbalance between promoters and inhibitors in the kidneys[9].The factor affecting stone formation are urine output (hence the concentration).The concentration of specific constituent, urine pH, and infection or damage within the urinary tract.[10]

Table 1: Basic Mechanism and Mediator of Kidney Stone Formation.

Mechanism	Mediator
Saturation/supersaturation	Dietary-habits/inborn abnormalities
Crystallization	Inhibitor/Promotors
Crystal retention	Crystal size/ crystal adherence/ inhibitors
Stone formation	Continuous retention

Factor affecting stone formation [10]

- Crystalluria
- Retention
- Infection
- Inhibitors

EPIDERMOLOGY OF UROLITHIASIS:

Urolithiasis is a worldwide problem. The yearly incidence of urolithiasis is estimated to be about 0.55 in North America and Europe. Urolithasis is largely a recuurent disease with a relapse rate of 50% in 5-10 year and 75% in 20 year. It is estimated that 12% of world population experiences renal stone disease with a recurrence rate of 70-80% in male and 47-60% in female.[1, 2, and 12]

TABLE.2: Stone Promotor and Inhibitors. [11]

Promotor	Inhibitors	
Calcium	Inorganic	Organic
Sodium	Magnesium	Nephrocalcin
Oxalate	Pyrophosphate	Tamm-Horsfall protein
Urate	Citrate	Urinary-prothrombin fragementI
Cystine		Protease inhibitors
Low urine pH		Glycosaminoglycans
Tamm-Horsfall protein		Highurine flow

PATHOPHYSIOLOGY OF UROLITHIASIS[13]

There are basic two aspects in the pathogenesis of kidney stone.

(a) Increased urinary excretion of stone forming constituent elements like calcium, phosphorus, uric acid, oxalate and cysteine.
(b) Physico-chemical change that influence stone formation like pH of urine, stone matrix and protective substance in urine.

For a stone to form within the urinary tract, Urine must be supersaturated for precipitating crystalline component. The agents which can modify nucleation, crystallization, and aggregation ,pH of the urine also play important role in stone formation.[13]

The degree to which different risk factors contribute to stones disease varies in different populations. Many patients had more than one risk factor.

- Hypercalciuria: 61%, including some patients with primary hyperparathyroidism
- Hyperuricosuric calcium stones: 36%
- Gouty diathesis: 10%; these patients had normal uric acid excretion but a low urine
- pH and developed either calcium or uric acid stones.
- Hypocitraturia: 28% idiopathic and 3.3% due to distal renal tubular acidosis
- chronic diarrhoea
- Hyperoxaluria: 8%, including enteric and primary forms and markedly increased
- oxalate intake
- Low urine volume (1 lit /day): 15%

Other types of stones were less common:

- Struvite stones: 6%
- Cystine stones: 0.9%
- Difficult to classify due to borderline abnormal values: 3.5%
- No metabolic abnormality: 4%

SIGNS AND SYMPTOMS OF UROLITHIASIS [14]

Symptoms of kidney stones include

- Colicky pain, Nausea/vomiting
- Hematuria, Pyuria, Dysuria, Oliguria

DIAGNOSIS OF UROLITHIASIS [14]

Based on clinical symptoms of the location and severity of the pain diagnosis is done.

Imaging like x-ray, computed tomography, ultrasound is used to confirm the diagnosis and a number of other tests can be undertaken to help establish both the possible cause and consequences of the stone.

Other diagnostic methods

Other investigations typically carried out include:

- Microscopic study of urine, which may show proteins, red blood cells, bacteria, cellular casts and crystals.
- Culture of a urine sample to exclude urine infection (either as a differential cause of the patient's pain, or secondary to the presence of a stone).
- Blood tests: Full blood count for the presence of a raised white cell count (Neutrophilia) suggestive of infection, a check of renal function and to look for abnormally high blood calcium blood levels (hypercalcaemia)[14]

RISK FACTORS FOR KIDNEY STONES [15]

A precise causative factor is not identified in most cases. A family history of kidney stones (increases risk by three times), insulin resistant states, a history of hypertension, primary hyperparathyroidism, a history of gout, chronic metabolic acidosis, and surgical menopause are all associated with increased risk of kidney stones. Most patients (up to 80%) with calcium stones have one or more of the metabolic risk factors, and about 25% of stones are idiopathic in origin.

Various drug that increase the risk of stone disease.

Decongestants: ephedrine, guaifenesine.
Diuretics: triamterene.
Protease inhibitors: indinavir.
Anticonvulsants: felbamate, topiramate.

The risk factor due to some drug treatments cannot be forgotten. Drugs associated with stone formation include triamterene (Dyrenium) and the sulfonamides, which have low solubility. Calcium and vitamin D supplements cause hypercalciuria, and carbonic anhydrase inhibitors, which are used to treat glaucoma, increase the urinary pH and precipitate calcium phosphate. Indinavir (Crixivan), a protease inhibitor, can also crystallize and form stones in the urinary tract [16]

TYPE OF STONE [16]

There are several types of renal stones that differ in composition and pathogenesis. The most common type of kidney stone is composed of calcium oxalate and is caused by metabolic disorders that are often treatable.

Calcium stones

Most stones contain calcium combined with oxalate, phosphate, or occasionally uric acid. All calcium stones are radio-opaque, and calcium oxalate and calcium phosphate stones are black, grey, or white and small (1cm in diameter) dense and sharply circumscribed on radiographs.

1. Hypercalciuria:(Defined as 0.1 mmol/kg body weight of patient per day, calculated for ideal bodyweight) can be idiopathic or result from any disorder that induces even mild hypercalcemia.

2. Hypocitrauria:is also associated with renal lithogenesis. Citrate act in the tubular lumen by combining with calcium to form a non-dissociable but soluble complex. Hypocitraturia could result from causes of intracellular acidosis such as renal failure potassium deficiency, distal renal tubular acidosis, chronic diarrhoeal state, and drugs such as acetazolamide.

Uric acid stones

Uric acid stones are smooth, round, yellow-orange and nearly radiographically transparent unless mixed with calcium crystals or struvite. Diets high in purines, especially those containing meats and fish, result in hyperuricosuria, and, in combination with low urine volume and low urinary pH, can exacerbate uric acid stone formation.

Struvite or triple phosphate stones

Struvite is a crystalline substance composed of magnesium ammonium phosphate. Radiographs show struvite stones as large,

gnarled, and laminated. They are associated with substantial morbidity infection. Signs of struvite stones include urinary pH greater than 7, staghorn calculi, and urease that grow bacteria on culture (proteus, klebsiella, pseudomonas).

Cystine stones

Formation of cystine stones is the only clinical expression of cystinuria, an autosomal recessive disorder. People who are homozygous for cystinuria excrete more than 600 mg per day of insoluble cystine. The stones are greenish- yellow,flecked with shiny crystallites, and are moderately radio-opaque with a rounded appearance.

Protease-related stones

This is the newest type of stone described. The increasing incidence of HIV-positive patients has led to widespread use of the protease inhibitor indinavir sulphate. Although the drug is generally well tolerated, it can be associated with urolithiasis 4–12% of patients. Thus, may coexist or form a nidus for indinavir stones vice versa.

TREATMENT AND PREVENTION OF UROLITHIASIS [12]

For treatment of urolithiasis medicinal or surgical procedure is carried out. Surgical treatment like(a) Shock wave treatment which is the only non-invasive treatment for stone disease(b)Endoscopic management, both ureterenooscopic and percutaneous nephrolithotomy provides an efficient way to treat stones irrespective of anatomy, composition and burden. The severe nature of renal colic has promoted a lower threshold at which narcotic analgesic, thiazide like diuretic and potassium citrate is prescribed.

Table 3: Medical Treatment of Urolithiasis Dependent on Pathophysiological Factor [12]

	Lifestyl or dietry modification	Pharmacolgical treatment
Low urine volume	Incresed fluid intake at least>2L. per day	
Hypercalciuria	1.Na moderation <200 mmol/L per day 2.Protein moderation	Hydrochlorthiazide or Indapamide +potassium alkali
Hypocitraturia	Protein moderation	Pottasium citrate
Hyperoxaluria	1.Oxalaterestriction,Avoidance of calcium restriction	Pyridoxime for primary hyperoxaluria
Hyperuricosuria	Purine restriction	Allopurinol
Low urinary pH	Protein restriction	Pottasium citrate
Cystinuria	High fliud intake >3L/day	Pottasium citrate β-mercaptoproprionyl glycine
Urinary tract infection		Antibiotic

HERBAL PLANTS USED IN UROLITHIASIS

Herbal drugs have created interest among the people by its clinically proven effects like immunomodulation, adaptogenic and antimutagenic. Number of medicinal plants shows antiurolthiatic activity and play vital role in prevention of disease. Here an attempt has been made to emphasis on potent indigenous herb for urinary stone.[8]

ANCIENT MEDICAL LITERATURE

In ancient Rome, Celsus (25 BC-50 AD) described lithotomy in his book 'De Medicine' and the technique was being followed almost without alterations till the end of 16th century. Hippocrates (370-460 BC) knew both the renal and vestical types of stones and described the typical ureteric colic and symptoms of bladder calculus. In the writings of Charaka, Sushruta and Vagbhatta, who lived in 2nd, 5th and 7th century AD, we find real description of the disease and indications for treatment. They recognized four types of stones. Pashanbheda is a drug mentioned in the Ayurvedic system of medicine for various ailments but mainly as a diuretic and lithotriptic. It is said to have properly of breaking and disintegrating the stones and is widely used drug. The very first mention of this drug in Ayurvedic literature is Charak Samhita (210 BC-170 AD) under the name Pashanbhed. It is recommended for painful micturition, for curing abdominal tumour and for breaking up calculi, Sushruta Samhita (170 AD- 340 BC) mentions the drug under various synonyms in Chikitsa silianam- under the name Pashanbhed for uric acid calculi and Ashnibhid for biliary calculi. In Sushruta Samhita, decoction of Pashanbhed, Ashmantaka, Satavari, Vrihati, Bhalluka, Varuna (Crataeva nurvula), kulatha, kola and kataka seeds have been described for the patients of Vataja Ashmari, while Kusa, Ashmabhid, Patala, Trikantaka, Sirisha, Punarnava and Silajatu and Meduka flower for Pittaja Ashmari have been mentioned.

[17] The Varuna bark - Crataeva nurvala has been extensively studied by a number of investigators in India. The pharmacology division of Central Drug Research Institute, Lucknow, India has carried out detailed pharmacological and chemical studies on this plant. Studies have shown that ethanolic extract has a dose related antiurolithiatic activity in albino rats induced by foreign body insertion method using glass beads. Costus spiralis is extensively used in Brazilian folk medicine for expelling urinary stones. Aqueous extract of C. spiralis when used at a dose of 0.25 and 0.5 g/kg / day for 4 weeks significantly reduced the growth of calcium oxalate calculi in the urinary bladder of rats. Antiurolithiatic activitiy of two compounds viz., 7-hydroxy- 2',4',5'-trimethoxyisoflavone and 7-hydroxy-4'methoxy isoflavone isolated from the heart wood of Eysenhardtia polystachya was studied in rats by observing calculus formation experimentally induced by zinc discs. A significant decrease in urinary stone size was observed in animals treated with these compounds. Experimental studies carried out on Crataeva nurvala, Tribulus terrestris and Dolichos biflorus showed them to be effective in preventing the deposition of stone material on glass beads in the urinary bladder of rats.

Department of Chemistry, University of Balaeric Islands, Spain have studied the antiurolithiatic activity of Zea mays, Rosa canina, Herniaria hirsuta and Agropyron repens in rats. The antiurolithiatic activity of Z. mays has been assigned to its diuretic activity. R. canina was found to have significant activity on calcium oxalate urolithiasis as it decreased calciuria and increased citraturia .

The antiurolithiatic activity of H. hirsuta has been assigned to increase in citraturia whereas A. ripens did not show any positive effects on the risk factors of urolithiasis. The effect of H. hirsuta on the adhesion of calcium oxalate monohydrate crystals to renal cells was studied which indicated that H.hirsuta altered crystal adhesion only under conditions of increased fluidity.

Studies were carried out on several Indian medicinal plants in our laboratory at Manipal and Tirupati. The plants studied were Aerva lanata, Ammannia baccifera, Asteracantha longifolia, Homonia riparia, Imperata cylindrica, Mimosa pudica and Rotula aquatica. Some of these plants showed promising results against magnesium ammonium phosphate and/ or calcium oxalate type of stones. The plants that showed promising antiurolithiatic activity are discussed below. Ethanolic extract of Ammania baccifera was found to be effective as prophylactic and curative against phosphate type of stones. Ethanolic extract of roots of Homonia riparia has effective prophylactic and curative activity against calcium oxalate and struvite stones. Ethyl acetate extract of Rotula aquatica showed significant antilithic activity against struvite stones and calcium oxalate stones. Phycocyanin a known antioxidant is reported to have potential antiurolithiatic activity as it reduces oxalate levels in kidney tissue significantly. The aqueous extract of Raphanus sativus showed antilithiatic activity on implants of calcium oxalate crystals or zinc discs in the urinary bladder of rats . The effect however is unrelated to increased diuresis or to a change of the muscarinic receptor affinity of the bladder smooth musculature to cholinergic ligands. [17]

Table.4: List of Drug Used In Urolithiasis and Urinary Tract Trouble[18, 19]

Sr.no	Name of Plants	Family	Part used	Medicinal uses
1	Abutilon indicum (L.) Sweet[20]	Malvaceae	Seed & Leaf extract	Extract is given for urinary disorder
2	Abutilon indicum(L.)	Malvaceae	Leaves	Juice taken twice daily for two weeks
3	Aegle marmelose(L.)	Rutaceae	Leaves and fruit	.1 spoon of Fruit pulp powder is taken orally with coconut milk for 14 days to dissolve kidney stones.
4	Aerava lanta(L.)[20,21]	Amaranthaceae	Leaves	Leaf extract is given twicw a day
5	Ageratum conyzoides(L.)	Asteraceae	Leaves	Leaf extract is given twice a day
6	Amaranthus caudatus(L.)	Amaranthaceae	Leaves	Extract is given in kidney stone
7	Amaranthus spinosus(L.)	Amaranthaceae	Root or plant	1 cup of whole plant is taken
8	Amaranthus viridis(L.)	Amaranthaceae	All parts	Given in kidney stone
9	Argemone maxicana(L.)	Papaveraceae	Root	Root powder is given for burning urination
10	Asphodelus tenuifolius (Cav.)	Liliaceae	Leaves	Decoction of leaves
11	Beta vulgaris(L.)	Amaranthaceae	Rhizomes	Daily two glass of rhizomes juice is given in kidney stone
12	Bombex ceiba (L.)	Bombacaceae	Stem and bark	Given for urinary problems
13	Borhaavia difffusa (L.)[20]	Nyctagenaceae	Root	Root decoction is given daily for one month in kidney stone
14	Cassia fistula(L.)	Caesalpinioideae	Fruit	Fruit powder is given with water for 3-4 month to expel the kidney stone
15	Celosia arigentia	Amaranthaceae	Seed	Seed powder is given in kidney problems
16	Ceropegia bulbos(L.)	Asclepidaceace	Tubers	Decoction of tubers is used to remove urinary bladder stone
17	Chenopodium album(L.)[27]	Chenopodiaceae	Leaves	Cokked leaves is given in urinary trouble
18	Coculus hirsutus(L.)	Menispeermacea e	Leaves	Leaf dried powder is given during burning urination
19	Corbichonia decumbens (Forrsk.)	Molluginacae	Leaves	Crushed leaves given orally
20	Costus speciosus (koen.)	Costaceae	Tubers	Decoction of tubers orally for stones
21	Cynodon dactylon(L.)[20]	Poaceae	Root	Root decoction is given in case of urolithiasis
22	Daucas carota(L.) [20]	Apiaceae	-	One glass juice is given fornight to remove kidney stone
23	Digera Muricata(L.)	Amaranthaceae	Leaves	Once in a day for urinary complains
24	Diospyros melaoxylon(Rox)	Ebenaceae	Fruit and bark	Fruit is given in urinary disorders
25	Equisetum debile (Roxb.)[20]	Equisetaceae	All parts	Whole plant juice is given twice a day for seven days
26	Gomphrena celosioides[20](Mart.)	Amaranthaceae	Whole plant	Juice is given twice a day for ten days
27	Grewia flavescens (A.Juss)	Tiliaceae	Root	Decoction of root powder to stop bleeding in urine
28	Pedalium murea (L.)	Pedaliaceae	Fruits	Decoction of fruit is used for urinary complains
29	Phy1llanthus emblica(L.)	Euphorbiaceae	Seed Powder	Given to avoid burning urination
30	Phyllanthus fraternus (Webster.)	Euphorbiaceae	Whole plant	Plant extract is given orally for 3-4 day to dissolve the stones
31	Pedalium murea(L.)	Pedaliaceae	Fruits	Decoction of fruit is given for urinary complains
32	Solanum surattence	Solanaceae	Root powder	Root decoction is given for seven day
33	Tinospora cordifolia(Wild.L)	Menispermaceae	Stem	Crushed stem is given orally to expel the stone
34	Tribulus terrestis(L.)[20,42]	Zygophyllaceae	Leaves	Used in treatment of kidney stone
35	Tridex procumbens(L.)	Asteraceae	Leaves	Leaf paste is given for kidney stone
36	Tubiflora Acaulis(L.F.)	Acanthaceae	Leaves	Leaf powder with water is given for urinary complains
37	Zea mays(L.)[20]	Poaceae	Tassel	Given orally to expel the stone

Table.5: List of Other Plants Useful in Dissolving Kidney Stone [8]

Sr No.	plant	family	uses
1.	Aerva javanica	Amaranthaceae	Herb diuretic, Purgative, Demulcent
2.	Ammania baccifera	Lythraceae	Ringworm, Parasitic skin affection, Anti-typhoid, Anti-tubercular properties
3.	Arctostaphylos ura ursi	Asteraceaer	Diuretic, Diaphoretic, Gout, Skin affection
4.	Ascyrum hypericoides	Asclepidaceae	Emetic and Cathartic
5.	Asparagus racemosus	Liliaceae	Herb tonic, Diuretic, Galactagogue
6.	Berginia ligulata	Saxifragaceae	Astringent. Diuretic, Lithontriptic
7.	Bridolia montana	Euphobiaceae	Bark Astringent,Anthelminetic
8.	Caesalpinia huga	Caesalpinioceae	RootDiuretic, Lithontriptic
9.	Chelidonium majus	Papaveraceae	Diuretic, Antispasmodic, bitter
10	Chimaphila numbellata	Cruciferae	Diuretic, Expectorant, Stimulant
11	Curcuma longa	Zingiberaceae	Diuretic, Choleretic, Hepatoprotective
12	Desmodium styracifolium	Papilionaceae	Roots Emmenagogue, Stomachic
13	Didymocarpus pedicellata	Gesneriaceae	Leaves Lithontriptic
14	Dolichos biflorus	Leguminoceae	Diuretic, Astringent, Tonic
15	Eupatorium puipurecum	Compositae	cathartic, emetic, diuretic, Antiscorbutic,
16	Homonia riparia	Euphorbiaceae	Root Laxative, Diuretic
17	Mentha piperita	Labiatae	Spasmolytic, Carminatives, Febrifuge, Nausea
18	Musa pardisiaca[20]	Musaceae	Laxative, Uraemia, Nephritis, Hypertension
19	Nothosaerva brachiate	Laminaceae	Diuretic, Neuralgia, Convulsions
20	Orthosiphon aristatus	Labiatae	Diuretic,Anti-inflammatory, Antibacterial

Table 6: List of Plants Showing Antiurolithiatic Activity by Dissolving the Stone.

Sr no	Plant	Family
1.	Alismatis rhizome[22]	Alismataceae
2.	Bryophyllum pinnatum[23]	Crassulaceae
3.	Citrus medica[24]	Rutaceae
4.	Costus spirallis[25]	Costaceae
5.	Crataeva magna[26]	Capparidaceae
6.	Eleusine cornala[28]	Poaceae
7.	Helianthus annuus linn.[29]	Asteraceae
8.	Ichnacarpus frutescens [30]	Apocynaceae
9.	Moringa Oleifera[31]	Moringaceae
10.	Mimusops elengi[32]	Sapotaceae
11.	Macrotyloma uniflorum[33]	Fabaceae
12.	Orthosiphon grandiflorus[34]	Lamiaceae
13.	Plecanthus umboinicus[35]	Lamiaceae
14.	Phyla nodiflora[36]	Verbenaceae
15.	Phyllanthus nirum[37]	Euphorbiaceae
16.	Plantago major[38]	Plantaginaceae
17.	Rahanus sativus [39]	Brassicaceae
18.	Solanum xantho carpum[40,41]	Solanaceae

CONCLUSION

Urolithiasis (nephrolithiasis) or kidney stone is formation of urinary calculi at any level of urinary tract affecting about 12% of world population with a recurrence rate of 70-80% in male and 47-60% in female. As evident from the above review, nature is the best combinatorial chemistry and has possible answers to all diseases for mankind. Herbal drugs and medicinal plants play a vital role in kidney stone diseases. Also the undesirable effect of the modern medicine has already been overcome by herbal drugs which have diverted the attention of the people towards herbal medicines. To increase the acceptability and awareness among the people, there is an urgent need to develop trust and faith towards the safer indigenous system by establishing its validity in treatment for stone diseases. Health care systems are going to become more & more expensive, therefore we have to introduce herbal medicine systems in our health care.

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