WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 5.045
Volume 4, Issue 4, 892-911. Review Article ISSN 2277– 7105

ANTI UROLITHIATIC HERBS AND EFFECTIVE SIDDHA FORMULATIONS

Nalini Sofia.H[1*], Manickavasakam.K[2], Vetha Merlin Kumari.H[3], Thomas M.Walter[4] and Mohan. S[5]

[1, 3]Lecturer, Department of Maruthuvam, National Institute of Siddha, Chennai.

[2]Director (Rtd.) National Institute of Siddha, Chennai.

[4]Lecturer, Department of Gunapadam, Govt.Siddha Mical College, Palayamkottai.

[5]Director (I/C National Institute of Siddha, Chennai.

Article Received on
21 Jan 2015,

Revised on 16 Feb 2015,
Accepted on 12 Mar 2015

***Correspondence for Author**
Dr. Nalini Sofia.H
Lecturer, Department of Maruthuvam, National Institute of Siddha, Chennai.

ABSTRACT

The World Health Organization (WHO, 2002) emphasized development and utilization of herbal drugs and traditional medicines for the benefit of the world population in terms of cost effectiveness and low side effect. Plant medicines are in great demand both in the developed as well as developing countries for primary health care because of their wide range of biological and medicinal activities, higher safety margin and low cost. Many medicinal plants have been employed for centuries to treat urinary stones. The present review focus on the botanical information, Phytochemistry, Therapeutic uses, potential Pharmacological effect of some of the herbs, and Siddha formulations, being used in Siddha system of medicine for urolithiasis.

KEYWORDS: botanical information, Phytochemistry, Therapeutic uses, potential Pharmacological effect.

INTRODUCTION

Urinary stones have plagued human's science the earlier records of civilization.[1] A kidney stone is a hard mass developed from crystals that separate from urine and build up on the inner surfaces of the kidney.[2] Urinary stones are polycrystalline aggregates composed of varying amounts of crystalloid and organic matrix. Crystal formation is modified by a variety of other substances found in the urinary tract, including magnesium, citrate, phosphate and a variety of trace metals. These inhibitors may act at the active crystal growth site or as inhibitors in solution (as with citrate).Calcium is a major ion present in urinary crystals.

Calcium nephrolithiasis is most commonly due to elevated urinary calcium, elevated urinary uric acid, elevated urinary oxalate or a decreased level of urinary citrate. Diuretic medications may exert a hypo calciuric effect by further decreasing calcium excretion. Uric acid stones comprise <5% of all urinary calculi and are usually found in men. Uric acid calculi can recur even more frequently. Dietary magnesium deficiency is associated with an increased incidence of urinary stone disease. Experimentally, lack of dietary magnesium is associated with increased calcium oxalate stone formation and calcium oxalate crystalluria.[1]

Plants are superior sources of molecular diversity and novel molecular chemotypes. The plant kingdom represents a rich store house of organic compounds, many of which have been used for medicinal purposes. Traditional herbal medicine is now showing encouraging results and receiving recognition and respect. In recent years, search for plants having medicinal properties has got much impetus. Plants having medicinal value have been rediscovered and the search is still on at global level.[2] This article is to focus the development of valuable phytomedicines from traditional medicinal plants in treating kidney stones. The present review incorporates 30 medicinal plants; few of a siddha formulations indicated for urolithiasis in ancient siddha literatures have potential antiurolithiatic activity in animal models and also clinically effective siddha drugs in the management of Urolithiasis.

1. Solanum xanthocarpum

The isolated chemical constituents of Solanum xanthocarpum, Solasonine and Solasodine were found to have well anti urolithiatic and natriuretic activity having a negligible kaliuretic activity.[3]

2. Pergularia daemia

The alcoholic extract of the whole-plant, Pergularia daemia significantly ($p<0.001$) lowered the urinary excretion and kidney retention levels of oxalate, calcium and phosphate. Furthermore, high serum levels of urea nitrogen, creatinine and uric acid were significantly ($p<0.001$) reduced by the extract. The reduction of stone forming constituents in urine and their decreased kidney retention reduces the solubility product of crystallizing salts such as calcium oxalate and calcium phosphate which could contribute to the anti urolithiatic property of the extract. The extract exhibited significant diuretic activity at dose of 400mg/kg body weight as evidence by increased total urine volume and the urine concentration of Na^+ and K^+.[4]

3. Tribulus terrestris

The aquauous extract of Tribulus terrestris in oral dose of 5g/kg elicited a positive dieresis, which was slightly more than that of furosemide. The diuretic and contractile effect of Tribulus terrestris indicate that it has the potential of propelling urinary stones.[5] Tribulus terrestris extract exhibited a concentration dependent inhibition of nucleation and the growth of CaOx crystals. When NRK-52E cells were injured by exposure to oxalate for 72hours, Tribulus terrestris extract prevented the injury in a dose-dependent manner.[6] In 0.2% ethylene glycol induced oxalate urolithiasis wistar rats, the alcohol extracts of Tribulus terrestris, was found to be effective than spironolactone a potassium - sparing diuretic in reducing stone forming constituents both in urine and renal tissues and also reduced, the enzyme activity of GAO and LDH, out of this the alcohol extract of Tribulus terrestris was found to be more effective and highly significant in the reduction of calculi, which can be used as anti urlithiatic agent.[7] 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.[8] All the three plants were shown to dissolve phosphate type of calculi in an in vitro model, where as oxalate, uric acid and cystine stones were not dissolved by *C. nurvala* and *D. biflorus* extracts. T. terrestris dissolved uric acid and cystine stones to some extent. Clinical studies carried out on *C. nurvala* showed that it changes the urinary chemistry of patients and thus it reduces the Lithogenic potential.[9]

4. Moringa oleifera

The effect of oral administration of aqueous and alcoholic extract of Moringa oleifera root-wood on calcium oxalate urolitiasis has been studied in Male Wistar albino rats. Ethylene glycol feeding resulted in hyperoxaluria as well as increased renal excretion of calcium and phosphate supplementation with aqueous and alcoholic extract of Moringa oleifera root-wood significantly reduced the elevated urinary oxalate showing a regulatory action on endogenous oxalate synthesis. The increased deposition of stone forming constituents in the kidneys of calculogenic rats was also significantly lowered by curative and preventive treatment using aqueous and alcoholic extracts. The results indicate that the root –wood of Moringa oleifera is endowed with antiurolithiatic activity.[10]

5. Momordia charantia

Treatment with aqueous extract (200mg/kg,p.o) and alcoholic extract of fruits of Momordia charantia Linn. Significantly ($p<0.001$) lowered the increased levels of oxalate, calcium and phosphate in urine and also significantly ($p<0.001$) reduced their retention in kidney. The treatment with aqueous extract and alcoholic extract of fruits of Momordia charantia significantly ($p<0.001$) lowered the increased levels Blood urea nitrogen, creatinine and uric acid. The reduction in the stone forming constituents in urine and renal tissue brought about by Momordia charantia Linn. could contribute to its antiurolithiatic property.[11]

6. Dolichos biflorus

An aqueous extract of Dolichos biflorus at 10 mg concentration produces higher dissolution of calcium oxalate crystal by in vitro Anti-urolithiatic activity as compared to other fraction.[12]

7. Raphanus sativus

The aqueous extract of the bark of Raphanus sativus was tested for its antiurolithiatic and diuretic activity. The urolithiasis was experimentally induced by implantation of zinc disc in the urinary bladder of rats. Significant decrease in the weight of stones was observed after treatment in animals which received aqueous extract in comparison with control groups. This extract showed an increase in the 24hours urine volume as compared to the control.[13]

8. Terminalia chebula

The aqueous extract of the fruit of Terminalia chebula in wistar albino rats decreased the elevated levels of oxalate and phosphate in urine as well as kidney tissue homogenate. The extract supplementation also prevented the elevation of serum levels ie, Blood urea nitrogen, Creatinie and Uric acid.[14]

9. Paronychia argentea

The aqueous extract and Butanolic extract of aerial parts of Paronychia argentea prevent urinary stone retention by reducing renal necrosis and thus inhibit crystal retention.[15]

10. Jasminum auriculatum

Supplementation with aqueous and alcoholic extract of Jasminum auriculatum flowers significantly ($p<0.001$) lowered the elevated levels of oxalate, calcium and phosphate in

urine and kidney of ethylene glycol induced hyper oxaluria model in albino rats, compared to cystone treated animals.[16]

11. Trigonella foenum graecum

The inhibitory effect of the aqueous extract of Trigonella foenum graecum seeds was examined on the formation of calcium oxalate renal stones induced by ethylene glycol with ammonium chloride. At the end of the experiment all kidneys were removed and examined microscopically for possible crystal/stone locations and the total calcium amount in the renal tissue was evaluated. The results showed that the amount of calcification in the kidneys and the total calcium amount of the renal tissue in rats treated with Trigonella foenum graecum was significantly reduced compared with the untreated group.[17]

12. Pyrachantha crenulata

Alcohol extract of Pyrachantha crenulata fruit significantly ($p<0.001$) lowered the elevated levels of oxalate, calcium and phosphate in urine and kidney of ethylene glycol induced hyper oxaluria to male albino rats.[18]

13. Benincasa hispida

Ethanolic extract of Benincasa hispida seeds significantly reduced the elevated urinary oxalate in 0.75%v/v Ehtyene glycol induced hyper oxaluria in wistar albino rats showing regulatory action on endogenous oxalate synthesis and significantly lowered the urinary excretion and kidney retention levels of oxalate, protein and calcium. Moreover, elevated serum levels of sodium, creatinine and calcium, phosphorous were significantly reduced by the extracts.[19]

14. Elettaria cardomomum

The inhibitory potency of different extracts of seeds of Elettaria cardomomum was evaluated on various stages of formation and on growth of calcium oxalate crystals. The alcoholic and aqueous extract has the higher capacity to inhibit the crystal formation and aggregation as compared to ethyl acetate and petroleum ether extracts.[20]

15. Carica papaya

Aqueous and alcoholic extracts of the fruit of Carica papaya significantly ($p<0.001$) reduce the elevated urinary oxalate, showing a regulatory action on endogenous oxalate synthesis. The increased deposition of stone forming constituents in the kidneys of calculogenic rats

was also significantly lowered by curative and preventive treatment using aqueous and alcoholic extracts of the fruits of Carica papaya. Treatment with aqueous and alcoholic extracts of the fruits of Carica papaya significantly showed marked improvement in the damages caused by the ethylene glycol to the kidney and reduction in the crystal deposition.[21]

16. Asparagus racemosus

Ethylene glycol induced urolithiasis in Wistar albino rats treated with ethanolic extract of Asparagus racemosus significantly($p<0.05$) reduced the serum concentrations of calcium, phosphorus, urea and creatinine and it elevated the urinary concentration of magnesium, which is considered as one of the inhibitors of crystallization.[22]

17. Cynodon dactylon

The ethanolic extract of Cynodon dactylon decreased the urine oxalate level in ethylene glycol induced urolithiasis in Wistar albino rats.[23]

18. Boerhaavia diffusa

The aqueous extract of Boerhaavia diffusa roots was found to possess a high total phenolic content and exhibited significant free radicals scavenging activity. Oxalate excretion significantly increased in hyperoxaluric animals as compared to control which was protected in Boerhaavia diffusa roots extract treated animals. Extract of Boerhaavia diffusa roots (BDE) treatment significantly reduced level of MDA and improved the activity of antioxidant enzymes followed by reduction in BUN and serum creatinine. In addition, BDE reduced the number of CaOx monohydrate crystals in the urine. Histological analysis depicted that extract of Boerhaavia diffusa roots (BDE) treatment inhibited deposition of CaOx crystal and renal cell damage.[24]

19. Coleus aromaticus

The urolithiatic rats treated with hydro alcoholic extract of Coleus aromaticus leaves (CALHAE) (300 and 600 mg/kg) have shown reduction in the number of calcium oxalate crystals in medulla region after 15 days treatment, as equiefficacious to cystone, treatment at 500 mg/kg dose level.[25]

20. Mimusops elengi

Alcohol extract of Mimusops elengi treated with ethylene glycol induced hyper oxaluria in male wistar albino rats significantly lowered the elevated levels of oxalate, calcium, and phosphate in urine and kidney thus reduces the risk of stone formation.[26]

21. Hordeum vulgare

Administration of ethanolic extrac of Hordeum vulgare seeds on ethylene glycol induced urolithiasis in male wistar albino rats significantly reduced the urinary excretion of the calcium, phosphate, uric acid, magnesium, urea and oxalate.[27]

22. Punica Granatum

The methanol extract and chloroform extract of Punica Granatum significantly decrease the urine oxalate, calcium and phosphate, renal tissue oxalates, serum creatinine, urea and uric acid in ethylene glycol induced urolithiasis in male wistar albino rats.[28]

23. Lawsonia inermis

The hydro alcoholic extract of Lawsonia inermis leaves showed anti urolithiatic activity especially calcium oxalate type of stones in ethylene glycol with ammonium chloride induced kidney calculi in male wistar rats.[29]

24. Lagenaria siceraria

Lagenaria siceraria fruit powder significantly reduces the elevated level of urinary oxalate, uric acid and creatinine on sodium oxalate induced urolithiasis in male wistar albino rats.[30]

25. Rubia cordifolia

Hydro alcoholic extract of Rubia cordifolia significantly reduced the increase of oxalate in renal tissue and also the elevated calcium contents in ethylene glycol induced urolithiasis male rats. The number of calcium oxalate deposits in the tubules of hydro alcoholic extract of Rubia cordifolia treated rats was less.[31]

26. Phyllanthus niruri

Phyllanthus niruri has an inhibitory effect on crystal growth, in a rat model of urolithiasis induced by introduction of calcium oxalate seed in bladder of rats. The effect may be due to higher Levels of glycosoamino glycans incorpated into calculi.[32] *In vitro* studies in which calcium oxalate precipitation was induced by addition of 0.1 M sodium oxalate to unfiltered urine samples from Wistar rats and normal humans in absence and presence of Phyllanthus

niruri extract (0.25 mg/ml), suggested that extract may interfere with early stages of stone formation.[33]

27. Crataeva nurvala

The effect of Crataeva nurvala bark decoction on calcium oxalate urolithiasis induced by 3% glycolic acid has been studied in rats. The decoction showed significant activity in preventing the deposition of calcium and oxalate in the kidney by inhibiting the activity of the Liver enzyme glycolic acid oxidase. Treatment with Crataeva nurvala bark decoction was reported to lower the levels of intestinal NaZ, KZ-ATPases.[34]

28. Aerva lanata

Administration of Aerva lanata aqueous suspension ((2g/kg body wt/day for 28 days) to CaOx urolithic rats had reduced the oxalate synthesizing enzymes, diminished the markers of crystal deposition in the kidney.[35]

29. Hypericum perforatum

Chronic administration of hydro alcoholic extract of Hypericum perforatum leaves (300 and 500mg/kg,orally) could significantly reduce the size and number of calcium oxalate deposits in Ethylene glycol induced kidney calculi in Wistar male rats.[36]

30. Nigella sativa

Administration of ethanolic extract of Nigella sativa (250 mg/kg,orally) reduced the number of calcium oxalate deposits and also lower the urine concentration of calcium oxalate in Ethylene glycol induced kidney calculi in Wistar male rats.[37]

Anti urolithiatic effect of Siddha formulations

1. Nerunjil kudineer

Urolithiasis was induced by 1% ethylene glycol administered in drinking water in Wistar strain female albino rats. Increase in serum urea was seen on day 14 and creatinine remained at the control value throughout the study. One group of ethylene glycol-treated rats received Nerunjil kudineer, a commercial Siddha drug containing powdered Tribulus terrestris, an indigenous plant.The drug-treated animals showed increased urinary output, decreased serum urea and crystalluria on day 14, and a tendency for alkalinization of urine compared with the ethylene glycol-treated animals, thus providing preliminary evidence for the clinical usefulness of this drug.[38]

2. Vediuppu chunnam

The efficacy of the two Siddha drugs, Aerva lanata and Vediuppu chunam as antilithic agents were studied in rats using 0.75% ethylene glycol in drinking water as a urolithic rat model. 650 mg – 1300 mg. Vediuppu chunnam (Sublimed form) along with Aereva lanata increases the urinary excretion of uric acid, calcium, oxalate, phosphorus and protein in hyperoxaluric rats and also decreases the magnesium excretion without adverse effects The drug increases the urine volume, thereby reducing the solubility product with respect to calcium oxalate and other crystallizing salts such as uric acid, which may induce epitaxial deposition of calcium oxalate.[39]

3. Silasatthu parpam

Karpoora silasathu act as a diuretic and Lithotriptic agent and is mainly indicated in the management of Renal calculi, Burning micturition and anuria. Magnesium present in *silasatthu parpam* increases the solubility of calcium oxalate and inhibits the precipitation of both calcium phosphate and calcium oxalate.[40]

4. Nandukkal parpam

'**Nandukkal Parpam'** is used by Siddha practitioners for management of urolithiasis in human beings. The effect of oral administration of **'Nandukal parpam'** (a Siddha combination drug) on calcium oxalate microlithiasis was studied in male wistar rats. Ethylene glycol and ammonium chloride in drinking water were given orally to male wistar rats to induce calcium oxalate crystals in renal tissue the initial phase of urinary stone formation. The deposition of calcium oxalate crystals in kidneys of wistar rats on ethylene glycol and treated with Nandukal parpam is much lesser than in the group of rats on ethylene glycol only ($p < 0.001$).[41]

Clinical study of Siddha formulations in kalladaippu

1. Venkara parpam

A clinical study of 30 renal calculi cases treated with 122 mg of venkara parpam with Raddish juice twice a day for 48 days. The stone was expelled in 3 cases. Calculi were completely dissolved in 12 patients. There is a significant difference between before and after treatment in the kidney stone size ($p<0.02$) and symptoms ($p<0.0001$).[42]

2. Kalladaippu thool

A clinical study of 30 renal calculi cases treated with 5gm of Kalladaippu thool with Raddish juice twice a day for 8 weeks. The stone was expelled in 4 cases. Reduction of stone size and number of stones were observed in 9 cases. The USG report revealed that there is no evidence of stone in 9 cases.[43]

3. Karpoora silasatthu parpam

An open clinical trial on Kalladaippu was conducted in NIS after obtaining approvalof Intitutional Ethics Committee (IEC- NIS/IEC/2011/03/04), which revealed that the mean standard deviation of renal calculi at before and after treatment were 8.30±3.16 and 4.2±4.03 respectively which is statistically significant ($t=6.092$ $p<0.001$) and the mean standard deviation of clinical symptoms score at before and after treatment were 4.95±1.89 and 2.93±0.66 respectively which is highly significant ($t=7.5$ $p<0.0001$).[44]

Table: 1 Anti urolithiatic plant descriptions[2, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54]

Sl.no	Plant name	Botanical name/ Family	Part used	Phytoconstituents	Therapeutic actions	Therapeutic uses
1.	Kandangattiri	Solanum xanthocarpum /Solanaceae	Leaves,Flowers, Fruits	Solasonine,Solasodine Solanocarpine	Expectorant,Anti oxidant, Anti cancer.	Cough, Asthma,Chest pain
2.	Uttamani	Pergularia daemia / Asclepiadeceae	Leaves	Sterols, Hentriacontane, Lupeol, B-amyrins, Calotropigenin, Calactin.	Expectorant,Emetic	Infantile diarrhea,Asthma
3.	Nerunjil	Tribulus terrestris /Zygophyllaceae	Whole plant	Tribulosin, Tribuloside,Ruscogenin,Diosgenin, Gitogenin	Diuretic, Aphrodisiac,Litholytic	Bladder stone, Dysuria, Calculus, Kidney diseases.
4.	Kattu murungai	Moringa oleifera /Moringaceae	Flowers, Bark, Root, Seeds,Gum	Alanine, Arginine, Glutamic&Aspartic acid, 4-Hydroxymellein, Moringine.	Diuretic, Anti lithic, Analgesic, Anti spasmodic.	Intermittent fever, Dysuria, Renal calculi, Chronic rheumatism.
5.	Pavakka chedi	Momordia charantia /Cucurbitaceae	Leaves, Fruits, Root.	Momoridicine, Carotene, Charintin	Anti diabetic, Hypotensive, Hypo cholesterolemic.	Anaemia. Diabetes, Jaundice, Haemorrhoids.
6.	Kollu	Dolichos biflorus /Leguminosae	Seeds	Dolichins A and B,Strepogenin,Dalbergiodin,β-galactosidase.	Hypolipidemic,Anti oxidant, Diuretic.	Leucorrhoa, Menstrual disorders.
7.	Mullangi	Raphanus sativus /Cruciferae	Leaves, Seeds, Root.	Raphanin, Sulphoraphanin,	Anti oxidant,Diuretic,	Calculus, Dysuria, Oliguria,

				Raphanusol A,	Lithotriptic	Syphilis.
8.	Kadukkai	Terminalia chebula /Combretaceae	Fruit	Chebulin, Terchebulin, Chbulinic acid,Gallic acid.	Diuretic, Anti spasmodic, ATPase inhibitor	Anaemia, Asthma, Calculus, Piles.
9.	Algerian tea	Paronychia argentea /Caryophyllaceae	Arial part	Oleanane saponins 1 and 2, Flavonol glycoside.	Anti diabetic,Anti urolithiatic, Nephro protective.	Diabetes, Kidney stone
10.	Udigai	Jasminum auriculatum /Oleaceae	Flowers,Roots	Indole, Methyl anthranilate.	Cordiotonic	Nephrolithiasis, Urolithiasis, Cardiopathy, Odontalgia
11.	Ventayam	Trigonella foenum graecum / Papillionaceae	Seeds	Graecunin E,Trigocoumarin, Quercetin, P-Coumaric acid.	Anti diabetic, Diuretic, Anti spasmodic, Aphrodisiac.	Diabetes, Dysentery, Oxaluria, Nephrosis,Hypertension.
12.		Pyracantha crenulata/ Rosaceae	Fruits,Flowers	Pyracranic acid,Vitexin,Apigenin,Luteoline.	Anti inflamatory,Hypotensive Coronary vaso dilator	Cardiac failure, Myocardial weakness,Hypertension, Arteriosclerosis,Burgor's disease.
13.	Pushanikai	Benincasa hispida /Cucurbitaceae	Fruits,Seeds	Manitol,n-triacontanol, Lupeol,Prolein, B-sitosterol	Diuretic, Anti pyretic	Haemoptysis, Other Haemorrhages from internal organs.
14.	Yelakkai	Elettaria cardomomum / Zingiberaceae	Seeds	Cineol, Terpineol, Terpinine, Limonene,Sabinin	Diuretic, Carminative, Emmenagogue.	Strangury, Urethrosis, Dysuria,

				e.		Dysmenorrhoea.
15.	Pappayi	Carica papaya / Caricaceae	Ripe and Unripe fruits	Carpaine, Carposide, Papain, Carpapasemine.	Analgesic, Antioxidant,Diuretic, Emmenagogue.	Nephrosis, Stone, Jaundice, Pancreatosis, Infertility.
16.	Shimai Shadavari	Asparagus racemosus / Liliaceae	Root	Sitosterol, Udecanyl, Cetanoate, Sarsasapoginin.	Diuretic, Aphrodisiac, Antispasmodic.	Dysuria, Haematuria, Spermatorrhoea, Infertility-female, Tuberculosis.
17.	Arugampullu	Cynodon dactylon / Gramineae	Juice of plants, Root.	B-ionone,2-propionic,4-hydroxy benzoic and 3-methoxy acids, Phytol,Saponins, Flavonoids.	Diuretic.	Bleeding piles, Wounds, Epilepsy, Hysteria, Haematuria.
18.	Mukaratte	Boerhaavia diffusa / Nyctaginaceae	Root	Punarnavine, C-Methyle flavones, Punanavoside,Hentriacontanes, b-Sitosterol.	Diuretic, Expectorant.	Anamia,Jaundice, Asthma, Ascites, Scanty urine.
19.	Karpuravalli	Coleus aromaticus /Lamiaceae	Leaves	Neoxanthin,Violaxanthin,Leutin, αandβ- carotene	Anti microbial,Anti oxidant,Diuretic, Antibiotic.	Cough,Nasal congestion,Throat infection.
20.	Magilam	Mimusops elengi / Sapotaceae	Leaves, Bark, Seeds.	Saponin	Astringent, Tonic	Fever, Chronic dysentery.
21.	Barliyarisi	Hordeum vulgare / Gramineae	Grains	Arginine,Cystine, Glycine,Leucine,Tyrosine.	Diuretic, Anti oxidant,Aphrodisiac.	Painful and atonic dyspepsia, used in the dietary of sick.

22.	Madalai	Punica Granatum / Punicaceae	Pulp, Fruit, Seeds, Stem bark, Root.	Pelletierine ,iso pelletierine, Methyl Pelletierine.	Diuretic, Analgesic, Antioxidant, Alpha amylase inhibitor.	Nephrosis, Dysmeorrhoea, Dysentry,Atheros clerosis.
23.	Marudondri	Lawsonia inermis / Lithraceae	Flowers, Seeds, Bark,Gum,Root .	Xanthones,Flavon oids,Triterpenes, Isoplumbagin.	Anti inflamatory, Abortifacient.	Calculi, Splenomegally, Jaundice, Skin disease.
24.	Shorakkai	Lagenaria siceraria / Cucurbitaceae	Leaves, Pulp,Flowers,Fr uits,Bark.	Cucarbitacins B,C,D and H, B-Glycosidase.	Anti inflamatory, Emetic, Purgative, Expectorant, Diuretic.	Jaundice,Bronchit is, Skin diseases, Dropsy.
25.	Manjiti	Rubia cordifolia /Rubiaceae	Roots	Xanthopurpurin, Munjistin, 1-methoxy 2-methoxy-methyl-3-hydroxy anthraquinone.	Diuretic,Anti inflamatory, Emmenogogue.	Rheumatoid arthritis, Neurolgia, Diabetes, Jaundice.
26.	Kilkaynelli	Phyllanthus niruri /Euphorbiaceae	Whole plant	Phyllanthin, Hypo phyllanthin.	Diuretic, Aldose-Reductase inhibitor, DNA polymerase inhibitor, HIV-RT-inhibitor,Anti spasmodic.	Diabetes, Calculus, Jaundice, Genito urinary tract diseases, Dysuria.
27.	Maralingam	Crataeva nurvala /Caparidaceae	Fresh leaves, Roots,Stem bark.	Varunol, Lupeol,Triterpenoi ds, Flavonoids-Rutin&Quercetin.	Diuretic, Litholitic, Natriuretic.	Calculi,Bladder stone, Hydrocele, Nephrosis, UTI.
28.	Sirupoolai	Aerva lanata /	Whole plant	B-sitosterol	Diuretic,Lithotrip	Cephalgia,

		Amarantaceae		palmitate, betlin, B-carboline,α-amyrin.	tic,Nephro protective.	Cough, Strangury,Lithiasis.
29.	John's wort	Hypericum perforatum /Hypericaceae	Herb	Hyperoside,Rutin, Flavonoid, Hyperin,Quercetin.	Anti inflamatory, Diuretic.	Excoriations,Wounds,Bruises.
30.	Karunjiragam	Nigella sativa / Ranunculaceae	Seeds	Melanthin, Melanthigenin	Anti oxidant,Diuretic	Amenorrhoea, Eczema,Nephrosis

CONCLUSION

This review indicates that all these herbs have possessed Diuretic, Lithotriptic, Nephro protective, Anti oxidant, Analgesic, Anti microbial, Anti spasmodic, effect and also used traditionally for many years in the treatment of Urolithiasis, Genito urinary tract diseases, Dysuria, Haematuria. Oliguria, and Kidney diseases. Therefore these herbs can be used for kidney stone disease as a single herbal drug or compound drug in the near feature.

REFERENCES

1. Smith & Tanagho's General Urology, Jack W.McAninch, Tom F.Lue, 18th Edition, The McGraw-Hill Companies USA, 2013.
2. Irfan Ali Khan and Atiya Khanum, Herbal medicine for human diseases vol II, 1st edition 2005, Ukaaz Pblications, Andhra Pradesh, India.
3. Anti-urolithiatic and natriuretic activity of steroidal constituents of Solanum xanthocarpum. Vina B Patel, Isverbhai S. Rathod, Jaymin M Patel, Maitreyee R. Brahmbhatt. Der Pharma Chemica, 2010; 2(1): 173-176.
4. Anti urolithiatic activity of whole-plant Hydro alcoholic extract of Pergularia daemia in Rats. B.A Vyas, R.B Vyas, S.V.Joshi, D.D Santani. Journal of Young Pharmacists, Jan-March 2011; 3(1): 36-40.
5. Tribulus terrestris. Preliminary study of its diuretic and contractile effects and comparison with Zea mays. Muneer Al.Ali, Salman wahbi, Husni Twaij, Ahmad Al-Badr. Journal of Ethnopharmacology, April 2003; 85(2-3): 257-260.
6. Diminution of oxalate induced renal tubular epithelial cell injury and inhibition of calcium oxalate crystallization in vitro by aqueous extract of Tribulus terrestris. A.Aggarwal, S.Tandon, S.K. Singla, C.Tandon. International Braz Journal of Urology.Vol.36 no-4 Rio d Jeniro July/Aug.2010.
7. Study the relative effect of Spironolactone and different solvent extract of Tribulus terrestris on urolithiatic rats. H.Satish, Dang Raman, Devi kshama, BG Shivananda, KA Shridhar. Pharmacognosy Magazine, 2009; 5(19): 83-89.
8. Studies on urolithiatic action of Indigenous drugs. Pramod K, Despande PS and Singh CM .Bull. Med. Ethnobot, 1981; 2: 277- 284.
9. Crataeva nurvala Hook and Frostn (Varuna). The Ayurvedic drug of choice in urinary disorders. Deshpande PJ, Sahu M and Pradeep kumar. Indian. J. Med. Res., 1982; 70: 46-53.

10. Effect of Moringa oleifera lam. Root-wood on ethylene glycol induced urolithiasis in rats. Ravindra V.Karadi, Navnet B.Gadg, K.R Alagawadi,Rudraprabhu V. Savadi. Journal of Ethnopharmacology, April 2006; 105(1-2): 306-311.
11. Antiurolithiatic activity studies of Momordia charantia Linn. Fruits. Biren N.Shah, Khodidas D. Raiyani and D.C.Modi. International Journal of Pharmacy Research and Technology, 2011; 1(1): 06-11.
12. Antiurolithiatic activity of Dolichos biflorus seeds. Unnati Atodariya, Roshni Barad, Siddhi Upadhayay, Umesh Upadhayay. Journal of Pharmacognosy and Phytochemistry, 2013; 2: 209-213.
13. Antiurolithiatic activity of Raphanus sativus aqueous extract on rats. R Vargas S, R.M Perez G, M.A Zavala S, C Perez G. Journal of Ethnopharmacology, December1999; 68(1-3:) 15 335-338.
14. Effect of Terminalia chebula fruit extract on ethylene glycol induced urolithiasis in rats. Anil.T.Pawar, Gayatri D.Gaikward, Kavita S.Metkari, Kiran A. Tijore, Jaydip V. Ghodasara, Bhanudas S. Kuchekar. Biomedicine and Aging Pathology, Jul-Sep 2012; 2(3): 99-103.
15. Pharmacological and Toxicological effects of Paronychia argentea in experimental Calcium oxalate nephrolithiasis in rats. Bouanani S, Henchiri C, Migianu-Griffoni E, Aouf N, Lecouvey M. Journal of Ethnopharmacology, March 2010; 129(1): 38-45.
16. Antilithiatic effect of flowers of Jasminum auriculatum vahl. Yogendr Bahuguna, Mohansingh Maniyari Ravat, Vijay Juyal, Vikas Gupta. International Journal of green pharmacy, 2009; 3(2): 155-158.
17. Prophylaxis effect of Trigonella foenum graecum L. seeds on renal stone formation in rats. Amina Laroubi, Mohammed Touhami, Loubna Farouk, Ibtissam zrara, Rachida Aboufatima, Ahmmed Benharref, Abderrahman chait. Phytotherapy Research, October 2007; 21(10): 921-925.
18. Evaluation of Pyrachantha crenulata roem for anti urolithogenic activity in albino rats. Y.M Bahuguna, M.S.M Rawat, V.Juyal, K.Gusain. African Journal of Urology, 2009; 15(3): 159-166.
19. Anti urolithiatic activity of Ethanolic extract of seeds of Benincasa hispida (Thumb).Patel RK, Patel SB, Shah JG. Pharmacology online, 2011; 3: 586-591.
20. Effect of seed extract of Elettaria cardamomum on calcium oxalate crystallization.Manish A Patel,Paras K.Patel, Dr.Avinash K.Seth .International Journal of Pharmacy Research and Technology, 2011; 1(1): 21-25.

21. Anti urolithiatic potential of the fruit extract of carica papaya on ethylene glycol iduced urolithiatic rats. Khatib Nayeem, Dhaval Gupta, Hsahilkar Nayana, Rajesh K.Joshi. Journal of Pharmacy Research, 2010; 3(11): 2772-2775.
22. Study of antiurolithiatic activity of Asparagus racemosus on albino rats. Narumalla jagannath, Somashekara S. Chikkana settee, Damodaram Govindadas, and Golla Devasankaraiah. Indian Journal of Pharmacology, Sep-Oct 2012; 44(5): 576-579.
23. Preventive effect of Cynodon dactylon against ethylene glycol induced nephrolithiasis in male rats. Abolfazl Khajavi Rad; Mousa-Al-Reza Hajzadeh , Ziba Rajaei; Mohammad-Hadi Sadeghian; Nooshin Hashemi; Zakieh Keshavarzi. Avicenna Journal of Phytomedicine.Article 3, June 2011; 1(1): 14-23.
24. Aqueous extract of Boerhaavia diffusa root ameliorates ethylene glycol-induced hyperoxaluric oxidative stress and renal injury in rat kidney. Surendra K. Pareta, Kartik C. Patra, Papiya M. Mazumder, Dinakar Sasmal. Pharmaceutical biology. December 2011; 49(12): 1224-1233.
25. Anti Urolithiatic and anti hyperlipidemic activity of Coleus aromaticus. An explanation of the underlying mechanisms. Venkatesh G, Baburao K , Rajesh babu M , Dhanalakshmi S ,Indira priya darshini G. International Journal of Phytomedicine, 2010; 2: 284-291.
26. Anti Urolithiatic and antioxidant activity of Mimusops elengi on ethylene glycol induced urolithiasis in rats. Purnima Ashok, Basavaraj C.Koli, and H.M Vishwanathswamy.Indian Journal of Pharmacology, Dec 2010; 42(6): 380-383.
27. Anti Urolithiatic and antioxidant activity of Hordeum vulgare seeds on ethylene glycol induced urolithiasis in rats. Shah JG, Patel PG, Patel SB Patel RK .Indian Journal of Pharmacology, Nov-Dec.2012, 44(6): 672-7.
28. Antiurolithiatic effects of Punica granatum in male rats. Rathod NR, Biswas D, Chitme HR, Ratna.S, Muchandi IS, Chandra R. Journal of Ethnopharmacology vol.140, Issue 2, 27March 2012; 234-8.
29. Anti urolithiatic effects of hydro alcoholic extract of Lawsonia inermis L. leaves.K.J.Kore, R.V Shete,P.J.Jadhav,M.P.Kabra .International Journal of Universal Pharmacy and Life Sciences, Sep-Oct2011; 1(2).
30. Effect of Lagenaria siceraria fruit powder on sodium oxalate induced urolithiasis in wistar rats.Rahuel V.Takawale, Vishal R.Mali, Subhash L.Bodhankar. Journal of Ayurveda and Integrated Medicine, April-June 2012; 3(2): 75-70.

31. Protective effect of the hydro alcoholic extract of Rubia cordifolia roots against ethylene glycol induced urolithiasis in rats. Kalyani Divakar , A.T. Pawar, S.B. Chandrasekhar, S.B. Dighe, Goli Divakar. Food and chemical Toxicology, April 2010; 48(4): 1013-1018.
32. The effect of Phyllanthus niruri on urinary inhibitors of calcium oxalate crystallization and other factors associated with renal stone formation. Freitas AM, Schor N and Boim MA. B. J. Urol. International, 2002; 89: 829.
33. Barros ME, Schor N and Boim MA. Effect of an aqueous extract from Phyllanthus niruri on calcium oxalate crystallization in vitro. Urol Res, 2003 Feb; 30(6): 374-9.
34. Effect of Crataeva nuruala in experimental urolithiasis. Varalakshmi P, Shamila Y, Latha E. J. Ethnopharmacol, 1990; 28: 313-321.
35. Effect of Aerva lanata on calcium oxalate urolithiasis in rats. P.Soundararajan, R.Mahesh, T.Ramesh&V.Hazeena Begum. Indian Journal of Experimetal Biology, December 2006; 44: 981-986.
36. Effect of hydro alcoholic extract of Hypericum perforatum leaves on Ethylene glycol induced kidney calculi in rats,Khalili M, Jalali MR, Mirzaei-Azandaryani M, Urol J, 2012 Spring; 9(2): 472-9.
37. Ethanolic extract of Nigella sativa L. seeds on ethylene glycol- induced kidney calculi in rats. Hadizadeh MA, Khoei A, Hadizadeh Z,Parizady M, Urol J. 2007 Spring; 4(2): 86-90.
38. Effect of Tribulus terrestris on Experimental Urolithiasis Induced by Ethylene Glycol in Albino Rats S. Satish, P. Periasamy, A. Namasivayam . Pharmacy and Pharmacology Communications 03/2011; 2(9): 437 - 439.
39. Selvam R, Kalaiselvi P, Govindaraj A, Balamurugan V, and Satish Kumar AS; Effect of Aerva lanata leaf extract and vediuppu chunnam on the urinary risk factors of calcium oxalate urolithiasis during experimental hyperoxaluria. Pharmacol. Res, 2001; 43: 89-93.
40. Dr. K.M. Nadkarani, Indian Materia Medica Vol: I Publisher: Popular Prakash, Mumbai, India.
41. Prophylactic effect of 'Nandukkal parpam' (a Siddha combination drug) on ethylene glycol induced calcium oxalate microlithiasis in the kidneys of wistar rats N arunai nambiraj, Tmr. panicker, S. seethalakshmi, chinnama abraham, M. paul korath, K jagadeesan.
42. A study on Azhal Kalladaippu, Dissertation, Reg.no 32081206, April 2011, The Tamilnadu Dr.M.G.R Medical University, Chennai.

43. A study on Kalladaippu, Dissertation, Reg.no 32041204, Sep.2007, The Tamilnadu Dr.M.G.R Medical University, Chennai.
44. Pre clinical and clinical study on Azhal Kalladaippu and the drug of choice is Karpoora silasathu parpam. Dissertation, Reg.no 32101204, April 2013, The Tamilnadu Dr.M.G.R Medical University, Chennai.
45. Medicinal herbs with their formulatios.M.P.Sing,Himadri Panda 2005, Daya Publishing House, Delhi.
46. Glossary of Indian Medicinal Plants, R.N.Chopra, S.L.Nayar, I.C.Chopra.National Institute of Science Communication and Information Resources(CSIR), 6th Reprint 2002, New Delhi, India.
47. Hand Book of Medicinal HERBS, James A.Duke, Mary Jo Bogenschutz-Godwin, Judi ducellier, Peggy-Ann K.Duke, 2nd edition, 1st Indian Reprint 2006, New York.
48. Herbal Materia Medica of Maharashtra, India, Dr.M.V.Patil,Prof.D.A Patil 2013, Daya Publishing House,Delhi.
49. Anti oxidant potential of methanolic extract of Dolichos biflorus in high diet fed rabbits.A.Kottai muthu, S.Sethupathy, R.Manavalan, PK.Karar.Indian Journal of Pharmacology, year 2006; 38(2): 131-132.
50. Hypo lipidemic effect of methanolic extract of Dolichos biflorus in high diet fed rats. A.Kottai muthu, S.Sethupathy, R.Manavalan, PK.Karar.Indian Journal of Experimental Biology, June 2005; 43.
51. Medicinal Plants in India, Vol.II, T.Pullaiah, 2002, Regency Publications, New Delhi.
52. A Hand Book of Medicinal Herbs.D.J.Deshpande, Reprinted 2010, Agrobios (India)
53. Medicinal and Aromatic Plants of Himachal Pradesh, Dr. Narain Singh Chauhan.
54. Coleus aromaticus Benth –A nutritive medicinal plant of potential therapeutic value, Rashmi Sahay khare, Shanta Banerjee and Kanika kundu, International Journal of Pharma and Biosciences, Jul-Sep 2011; 2(3).