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REVIEW ARTICLE

Anti-Urolithiatic activity of medicinal plants and Siddha formulatory medicine: - A Review

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ABSTRACT

Urolithiasis or urinary calculus is the formation of stones anywhere in the urinary tract. Standard pharmaceutical drugs used to prevent or treat urolithiasis are not effective in all cases, costly, quite common recurrences, risk of potential side effects and no guarantee. Despite the improvements in invasive medical techniques (Like Extracorporeal Shock Wave Lithotripsy (ESWL), Percutaneous nephrolithotomy (PCNL) etc.) the worldwide incidence of urolithiasis is quite high. Numerous medicinal plants have been chosen as an effective treatment of urolithiasis as they inhibit kidney stone. The use of medicinal plants assume important in Siddha system of medicine. In aspect of urolithiasis treatment, the medicinal plants have the potency to interrupt in the stone formation as well as efficacy to break the formed stone. So, in this present review evaluates data from in vitro and in vivo studies of medicinal plants and clinical trials of Siddha formulatory medicines revealed that the potential usefulness of herbal medicines in the management of urolithiasis.

KEYWORDS

Urolithiasis, Anti-urolithiatic activity, medicinal plants, Siddha medicines

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INTRODUCTION

Urolithiasis is the complex process that results from several physicochemical events including crystal nucleation, aggregation and retention in the urinary tract1. Primary and recurrent stone formations are the biggest challenges faced today and remain a major source of morbidity in humans. The peak age for onset of stone formation is in the third decade and increases with age until 70 2. Epidemiological data have shown that calcium oxalate is the predominant mineral in a majority of cases 3. The traditional medicine system of India is a rich source of valuable medicinal plants but there is no sufficient scientific data reported to establish the activity of these plants. Various medicinal plants have been employed to manage urolithiasis since ancient periods before inventing modern treatments. Scientific studies are mostly focused on phyto-therapy as it is proved to be vital in preventing recurrences of stone formation 4.

The purpose of this present review evaluates the data from in vitro and in vivo studies of medicinal plants and clinical trials of siddha formulatory medicines revealed that the potential usefulness of herbal medicines in the management of urolithiasis.

CURRENTLY USED HERBAL MEDICINES: IN VITRO STUDIES:

S.NO	MEDICINAL PLANTS	METHOD	MECHANISM OF ACTION
1.	*Phyllanthus niruri*	Titration method	Interfere with early stages of stone formation [5]
2.	*Peltophorum pterocarpum*	Titration method	More effective in dissolving calcium oxalate [6]
3.	*Dolichos biflorus* *Bergenia ligulata*	Titration method	Antilithiatic and anticalcification activity [7,8]
4.	*Pavonia lasiopetala*	Nucleation assay	Inhibiting crystallization [9]
5.	*Daucus carota*	Nucleation, growth & aggregation assay	Anticrystallization, reduction in crystal size, inhibitory effect on coax crystal aggregation [10]
6.	*Gossypium herbaceum*	Titration method	More effective in dissolution of coax [11]
7.	*Herniaria hirsute*	Nucleation and aggregation assay	Inhibiting aggregation [12]
8.	*Chloris barbata*	Titration method	Dissolving calcium oxalate [13]
9.	*Holarrhena antidysenterica*	Nucleation and aggregation assay, cell culture	Decrease the size of crystals, inhibition of coax aggregation [14]
10.	*Terminalia arjuna*	Scavenging, crystallization, crystal growth, crystal morphology assay,	Scavenge the free radicals, inhibits crystal aggregation [15]

ANIMALS IN VIVO STUDIES:

S.NO	MEDICINAL PLANTS	PART USED	MECHANISM OF ACTION
1.	Combination of *Tribulus terrestris,* *Boerhavia diffusa,*	Fruit, root, leaves	Antiurolithiatic [16]
2.	*Aerva lanata*	Flowers Whole plant	Antiurolithiatic [17] Antiurolithiatic & diuretic [18]
3.	*Craetava nurvala*	Bark decoction	Preventing the deposition of calcium and oxalate [19]

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S.NO	MEDICINAL PLANTS	PART USED	MECHANISM OF ACTION
4.	*Ammi visnaga*	Seeds	Antilithiatic and diuretic [20]
5.	*Phyllanthus niruri*		Inhibitory effect on crystal growth [21]
6.	*Phoenix dactyleferae*	Seeds	Antiurolithiatic [22]
7.	*Melia azedarach*	Leaves	Reduced urinary calcium, oxalate, phosphate [23]
8.	*Moringa oleifera*	Root	Reduced urinary oxalate, regulatory action on endogenous oxalate synthesis in hyperoxaluria [24]
9.	*Plectranthus amboinicus*	Leaves	Effect against renal calculi [25]
10.	*Peperomia tetraphylla*	Whole plant	Preventive and curative properties in urolithiasis [26]
11.	*Benincasa hispida*	Seeds	Antiurolithiatic [27]
12.	*Asparagus racemosus*	Plant	Antiurolithiatic [28]
13.	*Pergularia daemia*	Whole plant	Diuretic, lowering of urinary concentrations of stone forming constituents [29]
14.	*Ichnocarpus frutescens*	Root	Reducing the risk of CaOx super saturation [30]
15.	*Acorus calamus*	Rhizome	Diuretic, strongly suppressing various urolithiatic promotors [31]
16.	*Ipomoea eriocarpa*	Leaves	Inhibits the growth of urinary stones [32]
17.	*Aerva javanica*	Plant	Preventing growth of urinary stones, supporting folk information [33]
18.	*Biophytum sensitivum*	Whole plant	Diuretic, Antiurolithiatic [34]
19.	*Nothosaerva brachiate*	root	Supporting folk formation [35]
20.	*Viburnum opulus*	Fruits	Inhibition of oxalate, free radical production & Diuretic [36]

PRECLINICAL AND CLINICAL STUDIES USED IN THE TREATMENT OF UROLITHIASIS IN SIDDHA:

S.NO	SIDDHA MEDICINES	STUDY MODEL	MECHANISM OF ACTION
1.	*Megarajanga chooranam*	Animals in vivo	Lithotriptic [37]
2.	*Vediuppu chunnam*	Animals in vivo	Antilithiatic [38]
3.	*Nerunjil kudineer*	Animals in vivo	Diuretic and Lithotriptic [39]
4.	*Nandukkal parpam*	Animals in vivo	Diuretic and Lithotriptic [40,41,42]
5.	*Venkara parpam*	Animals &humans in vivo	Diuretic and Lithotriptic [39]
6.	*Kalladaippu thool*	Animals & humans in vivo	Diuretic and Lithotriptic [39]
7.	*Karpoora silasathu parpam*	Animals & humans in vivo	Diuretic and Lithotriptic [43]
8.	*Seenakaara parpam*	Animals in vivo	Antiurolithiatic [44]
9.	*Sirupeelai samoola kudineer*	Animals in vivo	Antiurolithiatic [45]
10.	*Tripala karpa chooranam*	Animals in vivo	CaOx crystal inhibitory, Diuretic, Epithelial cell protective, Hypocalciuric and Hypercitrauric effects [46]
11.	*Kalladaipu chooranam*	Animals & humans in vivo	Lithotriptic [47,48]
12.	*Neerkattu parikaara chooranam*	Animals & humans in vivo	Lithotriptic, Antispasmodic & Diuretic [49]

S.NO	SIDDHA MEDICINES	STUDY MODEL	MECHANISM OF ACTION
13.	*Aruvagai chooranam*	Animals & humans in vivo	Antiurolithiatic [50]
14.	*Combined medicines of* *Kukil parpam* *Neermulli kudineer* *Kalkaraichi maathirai* *Amirthathi kuligai*	Human in vivo	Diuretic and Lithotriptic [51]
15.	Combined medicines of *Keezhanelli chooranam* *Silasathu parpam* *Nerunjil kudineer*	Humans in vivo	Inhibitory effect on crystal growth, Diuretic & Lithotriptic [52]
16.	*Kara soda sathu parpam*	Animals in vivo	Antiurolithiatic [53]
17.	Combined medicines of *Sindhuvallathy mezhugu* *Kalladaippu kudineer*	Animals & humans in vivo	Antiurolithiatic [54]

CONCLUSION

The effects of various medicinal plants with proposed to prevent and treat to urolithiasis. The reviewed studies data from the in vitro, in vivo and clinical studies of Siddha medicines emphasized the potential effect of antiurolithiatic activity. People who were lack in awareness of traditional medicines believed herbal medicines can cause kidney diseases. This current review work is needed to overcome the above statement through sufficient research works done in Siddha system of medicine.

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CONFLICT OF INTEREST

There are no conflict of interest.

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