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HERBAL REMEDIES FOR UROLITHIASIS: A BRIEF REVIEW

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ABSTRACT

Urolithiasis has been a widespread issue for millennia, with a high occurrence rate. The purpose of this review is to reveal traditional anti-urolithiatic herbs and their mechanisms of action. Chemical principles from herbal sources have become considerably simpler, greatly contributing to the development of novel medications derived from medicinal plants. Urolithiasis is a prevalent illness that affects around 12% of the population, with recurrence rates of 70-81% in men and 47-60% in women. It causes serious health concerns such extreme pain, urinary tract obstruction, and infection, all of which have a negative impact on people's well-being. Treatment options include surgery, ureteroscopy, percutaneous nephrolithotomy (PCNL), and open or laparoscopic stone removal, all of which are costly and uncomfortable. Many synthetic medications used, such as diuretics and opioid analgesics. Many synthetic medications, such as diuretics and narcotic analgesics, are used to treat kidney stones; however, misuse of synthetic drugs, which increases the incidence of harmful pharmacological effects, has prompted people to revert to nature for safe herbal treatments. Conclusion: This review included all of the material on litholytic medicinal herbs. The use of herbal medicines for the prevention and treatment of diseases is gaining popularity due to the superiority and effectiveness of activity offered by natural elements in herbs and the negative effects of modern medication. Evidence shows that natural therapy is more helpful than other existing treatments since it has fewer side effects, is more cost effective, and has no danger of long-term fertility or re-occurrence. We examined all of the effective indigenous plants used to cure urolithiasis condition. This evaluation will provide chances for future research and the creation of new anti-urolithiatic substances.

INTRODUCTION

The two most ancient and painful urological illnesses are nephrolithiasis and urolithiasis. It is the third most common urinary system. It is anticipated that 12% of the population will experience it, with a recurrence rate of 47–60% in females and 70–81% in males. Any area of the urinary system, including the kidneys, ureters, bladder, and urethra, can develop stones. It causes major health issues that have a negative impact on people's well being, such as infection, urinary tract obstruction, and excruciating pain. Bacterial infections are typically the cause of urinary stones. physical, chemical, or genetic abnormalities that cause the urine to become supersaturated with salts that cause stones. Kidney stones result from repeated urinary tract infections caused by urease-producing bacteria such as Pseudomonas aeruginosa, Proteus vulgaris, Enterobacter spp., Serratia spp., Staphylococcus aureus, and Staphylococcus epidermatitis. A series of physiochemical events, including super saturation, nucleation, growth, aggregation, and retention inside the renal tubules, result in the complex process of stone formation.

CAUSES

Major causes include inadequate water intake, reduced urine output, deposition of calcium and other minerals in kidney and urethra, hereditary factors and some medications.

RISK FACTORS

Individual or family background, Metabolic diseases like gout, hyperthyroidism, renal tubular acidosis, and cystic renal disease, Dehydration, Diets high in animal protein, salt, and sugar, Urinary tract infections or obstructions, Digestive disorders and gastric surgery, Specific drugs and supplements.

SIGNS AND SYMPTOMS

Hematuria, back and upper abdominal pain, nausea, vomiting, urination difficulties, urine discoloration, foul smell of urine, decreased urine flow, burning sensations while urinating, fever, chills, urinary tract infection, and incontinence.

STONE TYPE	METABOLIC ABNORMALITY	CLINICAL SETTING
Calcium oxalate	Hypercalciuria	Cushingsyndrome, sarcoidosis, hyperthyroidism, immobility, elevated vitamin D, elevated dietary sodium, and genetic predisposition
	Hyperoxaluria	Primary hyperoxaluria, elevated dietary vitamin

		C dosages, and increased oxalate absorption (inflammatory bowel illness).
Calcium phosphate	Hypocitraturia Hypercalciuria High urine pH (>7)	Comparable to distal renal tubular acidosis, calcium oxalate, and the use of drugs that impede carbonic anhydrous metabolism.
Struvite	Highurinary ammonium and bicarbonate level	infection of the urinary tract caused by urease-splitting organisms.
Uric Acid	Low urine pH (<5.5) Hyperuricosuria	Metabolic disorders, insulin resistance, type 2 diabetes
Cystine	Cystinuria	Hereditary disorder

PATHOPHYSIOLOGY

Pathophysiology of kidney stone is a complicated biochemical process. The biological process of renal stone development includes urine supersaturation and physicochemical alterations. Supersaturation causes solutes to precipitate in urine, which triggers nucleation and the formation of crystals. The pH and particular quantities of excess chemicals results in a change from liquid to a solid phase. Risk factors for crystallization include low urine volume and the degree of urinary saturation with regard to the components that form stones, such as calcium, phosphorus, uric acid, oxalate, and cystine Therefore, the kinetics of a supersaturated solution which includes the rates of nucleation or crystal growth and thermodynamics, which causes nucleation, are what drive the crystallization process Therefore, avoiding supersaturation can help prevent lithiasis.

PREVENTION AND TREATMENT

DIET RECOMMENDATIONS

Drink plenty of fluid, Consumption of citrus fruits, limit foods with high oxalate content such as spinach, berries, chocolate, nuts, wheat bran, eat enough dietary calcium, avoid extra calcium and vitamin C supplements, high salt intake, moderate protein intake.

SURGICAL TREATMENT

When standard therapy fails to remove uroliths, surgical methods are used. Furthermore, it became an efficient management tool for breaking the stones, which subsequently pass naturally. Surgical methods for nephrolithiasis include extracorporeal shock wave lithotripsy (ESWL), percutaneous nephrolithotomy (PCNL), ureteroscopy, and open surgery. While laparoscopy equipment and apparatus are being clinically evaluated to evolve as a therapy alternative.

In ESWL a lithotripter, an external power source that produces low frequency acoustic waves and a high intensity shattering force. The body is subjected to high energy shock waves, which are utilized to fragment stones.

PNCL is performed when kidney stones measure more than 2 cm and lower pole stones measure more than 1.0 cm, this procedure is recommended for patients with staghorn calculi under radiological control.

Open surgery is recommended for patients who have non-functioning kidney, skeletal deformity, structural anomalies (such as stricture, PUJ blockage, and infundibular stenosis), obesity, and concomitant medical illnesses.

HERBAL THERAPY

Herbal medicine phytotherapy has been chosen as an alternate or supplementary therapy in the medical management of urolithiasis.

SL.No	BOTANICAL NAME	FAMILY	PART USED
1.	*Abelmoschus moschatus*	malvaceae	Herbs
2.	*Abutilon indicum*	euphorbiaceae	Leaf juice
3.	*Acalypha indica linn*	Euphorbiaceae	Whole plant
4.	*Achyranthes aspera L*	Amaranthaceae	Roots
5.	*Achyranthes indica linn*	Amaranthaceae	Roots
6.	*Aegle maemelose L.Corr.*	Rutaceae	Fruit pulp, leaf
7.	*Aerva lanata*	Amaranthacea	Whole plant
8.	*Ageratum conzoides*	Asteraceae	Whole plant
9.	*Alhagi mannifera*	Fabaceae	Roots
10.	*Alismatis rhizome*	Alismataceae	Whole plant
11.	*Amaranthus caudatus*	Amaranthaceae	Leaves
12.	*Amaranthus spinosus*	Amaranthacea	Root
13.	*Amaranthus viridis*	Amaranthacea	Whole part
14.	*Ammannia baccifera*	Lythraceae	Leaves
15.	*Amni visnaga*	Apeacea	Whole plant
16.	*Apuim graveolens*	Apiaceae	Flower
17.	*Argemoni mexicana*	Papavaraceae	Root
18.	*Armoracia lopathifolia*	Cruciferae	Seeds
19.	*Asperagus recemosus*	Asparagacea	Roots
20.	*Asphodulus ternifolius*	Liliacea	Leaves
21.	*Avverhoa carambola*	Avverrhoeaceae	Fruits
22.	*Bambusa nutans*	Poaceae	Shoot
23.	*Barabarea vulgaris*	Brassicaceae	Roots, leaves
24.	*Bauhena acuminata*	Caesalpiniaceae	Bark, leaves
25.	*Benincasa hipsida*	Cucurbitaceae	seed
26.	*Berberis vulgaris*	Berberidaceae	Root, bark

27.	*Bergenia ciliata*	Saxifragaceae	Rhizome
28.	*Bergenia ligulata*	Saxifragaceae	Rhizome
29.	*Bombex ceiba*	Bombacaceace	Stems, bark
30.	*Boerrhavia diffusa*	Nyctaginaceae	Root
31.	*Bonnaya brachiata*	Scrophulairacea	Whole plant
32.	*Bridalia crenulata*	Euphorbiacea	Stem, bark
33.	*Bridolia montana*	Euphorbiacea	Bark
34.	*Bryophillum calycinum*	Crassulacea	Leaves
35.	*Bryophillum pinnatum*	Crassulacea	Fresh leaf juice
36.	*Caesalpinia huga*	Caesalpiniacea	Root
37.	*Capsella bursapastor*	Brassicaceae	Entire herb
38.	*Cassia fistula*	Caesalpinioideae	Fruits
39.	*Cardamine hirsute*	Brassicaceae	Whole plant except root
40.	*Carica papaya*	Caricaceae	Young fruit
41.	*Cedrus deodara*	Pinaceae	Heart wood
42.	*Celosia argentea*	Amaranthaceae	Roots
43.	*Celtis australis*	Urticaceae	Leaves
44.	*Ceropegia bulbosa*	Aselepidaceae	Tubers
45.	*Chenopdium album Linn*	Chenopodiaceae	Leaves
46.	*Citrus medica*	Rutaceae	Unripe fruits
47.	*Coleus aromaticus*	Lamiaceae	Leaf
48.	*Corbichonia decubens*	Molluginaceace	Leaf
49.	*Costus speciosus*	Costaceae	Tubers
50.	*Costus spiralis*	Zingiberaceae	Whole plant
51.	*Crateva magna*	Capparidaceae	Bark
52.	*Crateava nurvula*	Capparidaceae	Bark
53.	*Crinum asiaticum*	Amaryllidacea	Bulb
54.	*Cucumis sativus*	Cucurbitaceae	Leaves
55.	*Cucumis trigonus*	Cicurbitacea	Fruit
56.	*Curcuma angustifolia*	Cucurbitacea	Whole plant
57.	*Cuminum cyminum*	Umbelliferae	Fruit
58.	*Curculigo orchioides*	Amaryllidaceae	Roots
59.	*Cyclea peltata*	Menispermaceae	Root
60.	*Cymbopogon citrates*	Poaceae	Whole plant
61.	*Cynodon dactylon*	poaceae	Root
62.	*Dactus carota*	Apiaceae	Gajar juice
63.	*Desmodium styracifolium*	Leguminosae	Whole plant
64.	*Desmodium microphyllum*	Papilionaceae	Whole plant
65.	*Dichrostachys cinerea*	Mimosaceae	Root
66.	*Didymocarpus pedicellata*	Gesneriaceae	Leaves
67.	*Digera muricata*	Amaranthaceae	Leaves
68.	*Diospyros melaoxylon*	Ebenaceace	Fruit, flower, bark
69.	*Docynia indica*	Rosaceae	Fruit
70.	*Dolichos biflorus*	Fabaceae	seeds
71.	*Duchesnea indica*	Rosaceae	Whole plant
72.	*Eleusine coracana*	Poaceae	Bark
73.	*Embilica offinalis*	Euphorbiaceae	Fruit
74.	*Enhydra fluctuans*	Asteraceae	Aerial parts

75.	*Equisetum debile*	Equisitaceace	All parts
76.	*Eupatorium birmaniosum*	Asteraceae	Leaves
77.	*Ficus carica*	Moraceae	Fruit,latex
78.	*Fragaria indica*	Rosaceae	Vegetative part
79.	*Fragaria nilgerensis*	Rosaceae	Vegetative part
80.	*Gomphrena celosioides*	Amaranthaceae	Whole plant
81.	*Grewia flavescens*	Tiliaceae	Root
82.	*Hedychium aurantiacum*	Zingiberaceae	Rhizomes
83.	*Hedychium coranaruim*	Zingiberaceae	Rhizome
84.	*Helianthus annuus*	Asteraceae	Fresh leaves
85.	*Hemidesmus indicus*	Asclepiadaceae	Root
86.	*Herniaria hirsuit*	Illecebraceae	Whole plant
87.	*Hibiscus sabdariffa*	Malvaceae	Leaves
88.	*Homonoia riparia*	Euphorbiaceae	Root
89.	*Hygrophilla spinosa*	Acanthaceae	Whole plant
90.	*Ichnoccarpus frutescens*	Pocynaceae	Roots
91.	*Indigofera tinctoria*	Papilionaceae	Roots
92.	*Ixora sub-sessilis*	Rubiaceae	Roots,seeds
93.	*Jasminum auriculatum*	Oliaceae	Flower
94.	*Kallanchoa pinnata*	Crassulaceae	Leaves
95.	*Knoxia roxburghii*	Rubiaceae	Leaves
96.	*Lagenaria siceraria*	Cucurbitaceae	Fruits
97.	*Lanata camara*	Verbenaceae	Leaves
98.	*Lawsonia inermis*	Lythraceae	Leaves
99.	*Lindernia ruellioides*	Linderniaceae	Whole plant
100.	*Macrotyloma unoflorum*	Fabaceae	Seed
101.	*Magnolia grandifolia*	Magnoliaceae	Leaves
102.	*Mallotus philippensis*	Euphorbiaceae	Bark
103.	*Melothria purpusilla*	Cucurbitaceae	Whole plant
104.	*Mentha arvensis*	Lamiaceae	Leaves
105.	*Mentha piperita*	Lamaiaceae	Entire herb
106.	*Mesua ferrea*	Clusiaceae	Flower
107.	*Mimosa pudica*	Mimosaceae	Roots
108	*Mimusops ellengi*	Sapotaceae	Bark
109.	*Momordica charantia*	cucurbitaceae	Fruits
110.	*Moringa ollifera*	Moringaceae	Pods,bark,root,wood
111.	*Musa bulbisiana*	Musaceae	Root
112	*Musa paradesica*	Musaceae	Stem juice
113.	*Nardostachys jatamansi*	Valerianaceae	Rhizome
114.	*Nelungo nucifera*	Nelungonaceae	Young leaves,flowers
115.	*Nigella sativa*	Ranunculaceae	Seeds
116.	*Ocumem sanctum*	Lamiaceae	Leaves
117.	*Olea europea*	Oleaceae	Oil
118.	*Origanum vulgare*	Lamiaceae	Whole plant
119.	*Orthosiphon spiralis*	Lamiaceae	Leaves
120.	*Oxalis corniculata*	oxalidaceae	Leaves
121.	*Parmelia perlata*	Parmeliaceae	Dried lichen
122.	*Paronychia argentea*	Caryophyllaceae	Aerial parts

123.	*Pavetta indica*	Rubiaceae	Roots
124.	*Pedalium murex*	Pedalliaceae	Fruit
125.	*Pergularia daemia*	Asclepiadaceae	Whole plant
126.	*Phyllanthus niruri*	Euphorbeaceae	Whole plant
127.	*Pimpinella anisum*	Apiaceae	fruit
128.	*Pinus eldarica*	Pinaceae	Fruit
129.	*Piper nigrum*	Piperaceae	Seed
130.	*Piper tongum*	Piperaceae	Leaves
131.	*Plantago major*	Plantaginaceae	Whole plant
132.	*Polygonatum multiflorum*	Lilliaceae	Root
133.	*Potentilla anscerine*	Rosaceae	Whole plant
134.	*Pyracantha crenulata*	Rosaceae	Leaves
135.	*Ranunculus sceleratus*	Ranunculaceae	Whole plant
136.	*Raphanus sativus*	Cruciferae	Bark
137.	*Rhus semialata*	Anacardiaceae	Shoots,leaves,fruits
138.	*Rhus succedanea*	Anacardiaceae	The powder of the fruit
139.	*Ricinus communis linn*	Ephorbiaceae	Root
140.	*Rosmarinus officinalis*	Lamiaceae	Leaves
141.	*Rotula aquatic*	Boraginaceae	Roots
142.	*Rubia cordifolia*	Rubiaceae	Roots
143.	*Rubus niveus*	Rosaceae	Leaves
144.	*Saccharum officinarum*	Poaceae	Stem
145.	*Santalum album*	Santalaceae	Oil
146.	*Sessamum indicum*	Pedaliaceae	Seeds
147.	*Sesbania grandiflora*	Fabaceae	Leaf juice
148.	*Sida acuta*	Malvaceae	Root
149.	*Smilax lanceaefolia*	Lilliaceae	Rhizome
150.	*Solanum indicum*	Solanaceae	Root
151.	*Solanum nigrum*	Solanaceae	Seed
152.	*Solanum surattence*	Solanaceae	Root
153.	*Solanum xanthocarpum*	Solanaceae	Berries
154.	*Swertia chyrata*	Gentianaceae	Stem
155.	*Syzygium aromaticum*	Myrtaceae	Flower bud
156.	*Tagetes erecta*	Asteraceae	Leaves
157.	*Tamarindus indica*	Fabaceae	Fruit bulb
158.	*Terminalia arjuna*	Combrataceae	Bark
159.	*Thunbergia alata*	Acanthaceae	Leaves
160.	*Tinospora cordiofolia*	Menispermaceae	Stem
161.	*Trachyspermum ammi*	Umbilliferae	Seeds
162.	*Trianthema portulacastrum*	Ficoidae	Fresh leaf juice
163.	*Tribulus terrestris*	Zygophyllaceae	Fruits, roots
164.	*Tridex procumbens*	Asteraceae	Whole plant
165.	*Tubiflora acaulis*	Acanthaceae	Leaves
166.	*Wedalia chinensis*	Asteraceae	Whole plant
167.	*Xanthium strumarium*	Asteraceae	Root

CONCLUSION

The present review covered the information about litholytic medicinal plants. Due to the negative effects of modern medicine combined with the superiority and effectiveness of activity offered by natural ingredients in herbs, there is growing interest in the use of herbal treatments for the prevention and cure of illnesses. Research indicates that natural therapy is more beneficial than other treatments now in use since it has fewer side effects, is cost-effective, and carries no danger of long-term infertility or recurrence. Since modern medicine lacks appropriate medications, herbal therapies have been shown to be useful at various stages of the pathophysiology of stone disease. As an adjunctive treatment, plant-based therapy is utilized to provide greater comfort.

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