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BEYOND CONVENTIONAL TREATMENTS: EXPLORING PHYTOCHEMICAL REMEDIES FROM LAURACEAE AND OXALIDACEAE IN UROLITHIASIS

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ABSTRACT: Kidney stones are also called as renal calculus or nephrolith. These are small, hard, deposits of mineral and acid salts on the inner lining of the kidney. Nephrolithiasis is characterized by the formation of renal calculus within the kidneys. When these stones leave the renal pelvis and travel into the remaining portions of the urinary system, which includes the ureters, bladder, and urethra, this condition is known as urolithiasis. Urolithiasis has become a serious global health problem and it is a common painful urologic condition that affects 12% of people worldwide. Nephrolithiasis is more common in men as compared to women and the recurrence rate in men (70-81%) is also higher than the females (47-60%). People of all ages are affected by urolithiasis but the age between 50 and 60 years was the peak age for the formation of calcium oxalate stones. Lauraceae is one of the most common and widely spread families. The plants of Lauraceae family are grown in tropical and warm climates. Some species of Lauraceae family are used globally as folk medicines to cure a variety of illnesses. In spite of this, it has observed that only a small number of Lauraceae species have been examined for their antiurolithiatic activity. Some plants of Oxalidaceae family are traditionally used by tribal people in the treatment of urolithiasis due to presence of bioactive phytoconstituent.

INTRODUCTION: Kidney stones are also called as renal calculus or nephrolith. These are small, hard, deposits of mineral and acid salts on the inner lining of the kidney. Nephrolithiasis is characterized by the formation of renal calculus within the kidneys¹. When these stones leave the renal pelvis and travel into the remaining portions of the urinary system, which includes the ureters, bladder, and urethra, this condition is known as urolithiasis.

Renal colic is a painful condition caused by renal calculus or kidney stones, which obstruct the flow of urine and cause difficulty during urination. After prostate diseases and urinary tract infections (UTIs), kidney stones are the third most prevalent urinary tract issue with a high relapse rate and it has become a significant cause of morbidity in people². 50% of people may experience a recurrence within 5–10 years³.

Urolithiasis has become a serious global health problem and it is a common painful urologic condition that affects 12% of people worldwide. Nephrolithiasis is more common in men as compared to women⁴ and the recurrence rate in men (70-81%) is also higher than the females (47-60%)⁵. People of all ages are affected by



urolithiasis but the age between 50 and 60 years was the peak age for the formation of calcium oxalate stones⁶. A number of risk factors may contribute to kidney stone formation. High animal protein intake, lesser intake of water, unhealthy lifestyle, high oxalate rich food intake (found in foods like beans, beer, coffee, berries, spinach, chocolate, some nuts, soda), low calcium intake, obesity, family history of stones and high consumption of salt are all common risk factors for the development of renal calculus. Various metabolic alterations such as hyperuricosuria (presence of excessive amount of uric acid in urine), hyperoxaluria (increased excretion of oxalate in urine), hypocitraturia (low amount of urinary citrate excretion), hypercalciuria (presence of excess calcium in the urine), and a history of gout (defective uric acid biotransformation) may lead to the formation of various types of kidney stones⁷.

These metabolic abnormalities cause an imbalance between stone promoters (calcium, uric acids) and inhibitors (magnesium, citrate, pyrophosphate) in the kidneys. Magnesium helps to dissolve the renal calculi and enhances the excretion of stones through urine and citrate inhibits stone formation by reducing the supersaturation of calcium salt⁸. Some drugs (indinavir, atazanavir, guaifenesin, triamterene, sulfonamides etc.) induce stones but this type of stones is rare⁹. Consumption of fish oil and vitamin C increases the incidence of calcium stones¹⁰.

Several disease conditions such as hypertension, diabetes and renal dysfunction induces the formation of various types of stones such as calcium stones, uric acid stones etc⁸. Some urease producing bacteria like *Pseudomonas aeruginosa*, *Proteus vulgaris*, *Staphylococcus aureus*, *Staphylococcus epidermitis* and some species of Klebsiella, Enterobacter break down urea, raising the pH of the urine and increase the concentration of magnesium ammonium phosphate ions in the urine. This creates a favourable environment which promotes the formation of stones¹¹. The kidney stones are classified on the basis of its mineral composition. Kidney stones are classified into four main categories: calcium (80%), struvite (5–15%), uric acid (5-10%) and cystine (1–3%)⁷. About 80% of kidney stones are formed by calcium oxalate

(CaOx) and calcium phosphate¹². Lauraceae is one of the most common and widely spread families. The plants of Lauraceae family are grown in tropical and warm climates. Some species of Lauraceae family are used globally as folk medicines to cure a variety of illnesses. In spite of this, it has observed that only a small number of Lauraceae species have been examined for their antiurolithiatic activity. Some plants of Oxalidaceae family are traditionally used by tribal people in the treatment of urolithiasis due to presence of bioactive phytoconstituent.

Mechanism of Kidney Stone Formation: A sequence of events is involved in urinary stone formation including urinary supersaturation, crystal nucleation, crystal growth, crystal aggregation and lastly, formation of kidney stone. Urine is a saturated solution of minerals and colloids. There is a balance between the inhibitors and the promoters of stones in urine.

Urinary Supersaturation: The supersaturation process starts when the level of stone promoters increases and the level of stone inhibitors decreases due to various metabolic disorders, unhealthy lifestyle, high consumption of animal protein, oxalate rich food, salts etc. Besides, low urine volume due to lesser intake of water, and increased fluid loss from the body may cause high concentration of metabolic products in urine. As a result, urine becomes supersaturated.

Crystal Nucleation: Nucleation is defined as a process of formation of a crystal from a solution. The solutes cannot remain dissolved beyond the supersaturation point and the solutes get precipitated, resulting the formation of tinny clusters of salts. In this step, the liquid of supersaturated solution is converted into solid crystal. Calcium oxalate crystallization is facilitated by renal tubule endothelial cell rupture.

Crystal Growth: Crystal growth is defined as the addition of new molecules of salts or stone forming substances to the existing nuclei. It is the subsequent essential step for the development of kidney stone.

Crystal Aggregation: Aggregation means the clustering of the existing crystals by interacting with other crystals present in supersaturated urine.

The developed crystals (stones) adhere to the renal tubule's epithelial cells which results in urolithiasis. Various nucleators are produced during the interaction between crystal and renal tubule's epithelial cells. Reactive oxygen species (ROS) are generated due to damage of endothelial cells of renal tubule by CaOx crystals. The increase level of ROS activates various signaling pathway (p38/MAPK) which causes apoptosis¹³. The elevated ROS level is responsible for releasing the inflammatory mediators such as interleukin-6 (IL-6), IL-1 β , monocyte chemoattractant protein-1¹⁴. All of these factors help to promote the gradual crystal formation, aggregation, and retention processes, which ultimately result in the production of stones.

Prevalence of Urolithiasis: The prevalence of kidney stones in both males and females has increased dramatically in developed nations over the last several decades. This is most likely due to dietary and lifestyle changes made by residents of these areas¹⁵. The prevalence of kidney stones varies worldwide. Central Europe, Scandinavia, the Mediterranean region, China, British Isles, northern Australia, Pakistan, parts of the Malay Peninsula and northern India have higher incidences of urinary stone than other regions. The "stone belt" region of India includes parts of Gujarat, Punjab, Maharashtra, Delhi, Rajasthan and Haryana².

Geography plays an important role in stone formation. Men are more susceptible to stone development due to the complex structure of male urinary system. Besides testosterone promotes the incidence of stone formation in males. But estrogen inhibits stone formation in females by maintaining urine alkaline and increasing citrate levels which serves as an inhibitor of stones¹⁶. According to several reports, vegetarians have a decreased chance of developing stones than non-vegetarians¹⁷. According to the report of WHO, the incidence of urolithiasis has been rising in numerous patients over the past few years due to unhealthy lifestyle, inadequate water consumption, high consumption of animal protein, oxalate rich food^{18,19}.

Current Management and Treatment for Urolithiasis: Numerous therapies are available for the treatment of urolithiasis. The best therapy is chosen on the basis of size and location of the stone

as well as severity of symptoms. Commonly used treatments include:

Pain Control: Painkillers are effective in managing urolithiasis-related recurring discomfort. Non-steroidal anti-inflammatory drugs (NSAIDs) such as paracetamol, diclofenac, ibuprofen, acetaminophen are commonly used as painkiller or anti-analgesic drugs to manage mild to moderate pain²⁰.

Opioids and other stronger painkiller are used to reduce severe pain. Alpha 1 adrenergic blockers such as tamsulosin relax the smooth muscle and relieve spasm. At least 2.5 to 3.5 liters of water should be consumed daily to prevent and treat recurrent urolithiasis²¹.

Thiazide Diuretics: Thiazide diuretics such as hydrochlorothiazide, chlorthalidone, indapamide are helpful for those who have renal stones or an elevated level of calcium in their urine. These medications help to eliminate the excess calcium from the body and inhibit the development of calcium stone^{10,20}.

Potassium Citrate: Potassium citrate inhibits the cystine and uric acid stone formation by making the urine less acidic. It creates an unfavorable environment for the formation of kidney stone by making the urine more alkaline²⁰.

Probiotics: *Oxalobacter formigenes* and other probiotics prevent stone formation within kidney by reducing oxalate excretion from body⁵.

Allopurinol: Allopurinol, a xanthine oxidase inhibitor, used to lower the uric acid level in the blood and urine in those individuals who have hyperuricosuria. Excessive consumption of dietary purine is the cause of hyperuricosuria. Allopurinol inhibits xanthine oxidase enzyme which is responsible for the formation of uric acid from hypoxanthine^{10,20}.

Extracorporeal Shock Wave Lithotripsy (ESWL): ESWL is a non-invasive medical procedure. The targeted stone is exposed to high intensity shock waves which facilitates the breakdown of stone into small fragments. These small fragments can be easily excreted from the body through urine²².

Ureteroscopy: A thin, flexible tube fitted with a camera is inserted between the bladder and urethra during this procedure. The stone is divided into tiny pieces using a laser so that these tiny pieces can be removed naturally²².

Percutaneous Nephrolithotomy (PCNL): A small incision is created in the back during this surgery and the stone is removed by using specialized instruments. It involves fragmentation and removal of large calculi from the kidney. This technique is especially effective for larger stones²².

Importance of Medicinal Plants in the Treatment of Urolithiasis: Since, ancient times, plants have been widely utilized as medicines in Ayurvedic, Unani, Chinese and other medicinal systems due to presence of a diverse range of phytoconstituents. Herbal medications are becoming more popular because of their effectiveness, low toxicity, and lack of adverse effects²³.

According to a WHO assessment, 80% of nations worldwide are dependent on medicinal herbs¹¹. Tribal peoples of different parts of the world have used traditional indigenous folk medicines to treat a variety of illnesses. They have great trust in folk medications due to promising and effective results of the herbal treatment^{23, 24}.

Almost, 20000 medicinal plants are used worldwide whereas India contributes 15-20% of the total. Conventional pharmacological treatments for urolithiasis are not effective to cure and prevent kidney stone. These medications are expensive, frequently cause recurrences and side effects, increase the risk of infertility, and have no assurance. For the treatment of urolithiasis, there is currently no genuinely effective medication. So, studies on therapeutic plants have expanded worldwide in the past few years. A review article has mentioned that 457 medicinal plants of 108 families used as antiurolithiatic drugs in different countries and cultures²⁶. The aim of this review is to cover all indigenous plants, belonging to the family Lauraceae and Oxalidaceae, are effective in the treatment of kidney stone.

Promising Plants against Urolithiasis:

***Cinnamomum tamala* L.:** *Cinnamomum tamalais* an evergreen, monoecious plant, found in tropical

and subtropical Himalayan region, belonging to the family Lauraceae. *Cinnamomum tamala*, locally known as “Tejpatta”. Numerous studies have demonstrated the pharmacological activity of *Cinnamomum tamala*, including its antihyperlipidemic, antidiabetic, gastro-protective, antihelminthic, anti-inflammatory, anticancer, antifungal, antibacterial and antioxidant properties. The leaf extract is traditionally used in the treatment of kidney stones. The leaf extract contains tannins, flavonoid glycosides, furanogermentone, β -caryophyllene, germacrene D, furanodienone, tetrahydroxyflavone, cinnamaldehyde, linalool, geraniol, eugenol etc^{37, 38}.

***Cinnamomum bejolghota* (Buch-Ham) Sweet:** *Cinnamomum bejolghota* (Buch-Ham) Sweet, an evergreen aromatic tree, is one of the medicinally important species in the genus *Cinnamomum* with a variety of ethnomedicinal and pharmacological uses. This species is found in Bangladesh, Bhutan, India, Myanmar, Nepal, Thailand, and Vietnam etc³⁹. Tribal or native peoples of different part of world used this plant as folk medicine. It is traditionally used for its antihelminthic⁴⁰ and cardiotoxic potential⁴¹. Due to presence of a diverse range of bioactive constituents such as terpenoids, proanthocyanidin, flavol-3-ols, flavon-3-ol glucoside, linalool, linoleic acid, geraniol, β -sitosterol, cinnamic acid, this plant is effective in the treatment of stomach disorder⁴², liver problems⁴³ and kidney stones²⁸. It also possesses wound healing property⁴⁴.

***Actinodaphne angustifolia* (Blume) Nees:** *Actinodaphne angustifolia* Nees. is traditionally used as folk medicine against diabetes and urinary disorder. It belongs to the family Lauraceae. The carbon tetrachloride (CCl₄) fraction of leaves of *A. angustifolia* shows cytotoxic, antioxidant, thrombolytic and antidiarrheal potential due to presence of β -sitosterol, quercetin-3-O-rhamnoside, vitexin, friedelin, and hydrocarbons⁴⁵. This species contains some important secondary metabolites such as isoquinoline alkaloids (aporphine), lignans, phenolic amides, lactones. The plant exhibits potent antioxidant properties by scavenging free radicals and anti-inflammatory potential by lowering inflammatory mediators against urolithiasis. It has lots of pharmacological importance such as

antioxidant, antidiarrheal, thrombolytic, decoction of the leaf is used in the treatment of antimicrobial, hypoglycemic activity. The urolithiasis.

TABLE 1: NAME OF ANTIUROLITHIATIC PLANTS BELONGS TO THE FAMILY LAURACEAE AND OXALIDACEAE

Sr. no.	Family	Name of the plant	Parts used	Chemical constituents	Uses	Ref.
1.	Lauraceae	<i>Cinnamomum tamala L.</i>	Leaf	Furanosesquiterpenoids, flavonoid glycosides, furanogermenone, cinnamaldehyde, tetrahydroxyflavone	Antiuro lithiatic, antidiabetic, antioxidant, antihyperlipidemic	5, 27, 30
2.	Lauraceae	<i>Cinnamomum bejolghota (Buch-Ham) sweet.</i>	Bark	Terpenoids, proanthocyanidin, flavol-3-ols, flavon-3-ol glucoside, linalool, linoleic acid, geranial, β -sitosterol, cinnamic acid	Antihypertensive, antidiabetic, antiinflammatory, antimicrobial, antihelmintic, anticancer, antivirulence, antiuro lithiatic	5, 28
3.	Lauraceae	<i>Actinodaphne angustifolia (Blume) Nees.</i>	Leaf	β -sitosterol, quercetin-3-O-rhamnoside, vitexin, friedelin, hydrocarbons	Antiuro lithiatic, antioxidant, antidiarrheal, thrombolytic, antimicrobial, hypoglycemic activity	1, 5, 28
4.	Lauraceae	<i>Cinnamomum aromaticum Nees/Cinnamomum cassia Presl.</i>	Bark	Terpenoids, phenylpropanoids, glycosides, lignans, lactones	Antitumor, antiinflammatory, analgesic, antidiabetic, antiuro lithiatic	29, 30
5.	Lauraceae	<i>Cinnamomum zeylanicum Blume</i>	Bark	Cinnamaldehyde, linalool, eugenol, β -caryophyllene, cinnamyl acetate	Antioxidant, antiuro lithiatic, antiinflammatory, antidiabetic, antimicrobial, anticancer, antihyperlipidemic	35, 36
6.	Lauraceae	<i>Cinnamomum verum J. Presl.</i>	Leaf	Eugenol, cinnamaldehyde, cinnamyl acetate, caryophyllene, and cinnamic acid	Antiuro lithiatic, antioxidant, anti-inflammatory, antimicrobial	26
7.	Lauraceae	<i>Persea gratissima Gaertn. fil.</i>	Leaf	Triterpenoids, flavonoids, alkaloids, saponins and tannins	Antiuro lithiatic, antioxidant, diuretic, antiinflammatory	26
8.	Lauraceae	<i>Persea americana Mill.</i>	Leaf	Saponins, flavonoids, alkaloids and tannins	Antiuro lithiatic, antidiabetic, antibacterial, antioxidant	34
9.	Lauraceae	<i>Laurus nobilis L.</i>	Bark of roots	1,8-cineole, sabinene, linalool, methyl eugenol, α -pinene, limonene	Antiuro lithiatic, antioxidant, antifungal, anticonvulsant	29
10.	Oxalidaceae	<i>Averrhoa carambola</i>	Fruit	Anthraquinone glycosides, flavonoids, β - sitosterol, rutin	Antioxidant, antiinflammatory, antiuro lithiatic	5, 8, 32
11.	Oxalidaceae	<i>Oxalis corniculata L.</i>	Leaf	glycosides, β -sitosterol, isovitexine, flavonoids	Antiuro lithiatic, antiinflammatory, antioxidant	5, 28,31
12.	Oxalidaceae	<i>Biophytum sensitivum</i>	Whole plant extract	Flavonoids (luteolin 7-methyl ether, isoorientin), isoflavones	Antiuro lithiatic, antioxidant, nephroprotective	26, 33, 61

Cinnamomum aromaticum Nees/ Cinnamomum cassia Presl: It is a tropical evergreen aromatic species which is widely used as folk medicine in China, India and other countries. The results of numerous researches demonstrated its anti-

inflammatory, antitumor, anti-diabetic, analgesic, antiviral, antibacterial potentials^{46, 47}. It is a well-recognized folk medicine which contains terpenoids (linalool, camphene, β -pinene, camphor, terpineol), phenylpropanoids (cinnamaldehyde,

cinnamyl acetate, ethyl cinnamate, cis-2-methoxycinnamic acid, coniferaldehyde, cinnamic acid), glycosides (cinnacasolide, cinnacasside), lignans (cinnassin), lactones and other compounds. It is a widely used traditional Chinese medication which is used to treat nephropathy, diabetes, dysmenorrheal^{48, 49}. These phytoconstituents are responsible for antitumor, antiinflammatory, analgesic, antidiabetic, antibacterial, antiviral, cardio protective and neuroprotective effects⁵⁰.

***Cinnamomum zeylanicum* Blume:** *Cinnamomum zeylanicum* Blume. is an evergreen plant which is widely used as spice and flavouring agent by people of different cultures. It belongs to the family Lauraceae. This plant is distributed in Srilanka, southern part of India, Madagaskar. The native peoples of India used this plant as a folk medicine from ancient time. Each part of *Cinnamomum zeylanicum* has medicinal values. It contains phytoconstituents like cinnamaldehyde, eugenol, linalool. It also contains some other bioactive compounds such as anthraquinone glycosides, tannins, flavonoids, phytosterols, phenols, saponins, diterpenes⁵¹. The hydro-alcoholic extract of *Cinnamomum zeylanicum* exhibits antiurolithiatic activity on calcium oxalate crystal by inhibiting the crystal aggregation⁵¹.

***Cinnamomum verum* J. Presl:** *Cinnamomum verum*, a well-known spice for its culinary and medicinal uses, is distributed in Southern India, Srilanka and many Australian, African, Asian, Caribbean countries. This plant is well recognized folk medicine which has lots of pharmacological values such as antioxidant, anti-inflammatory, antimicrobial, anticancer, wound healing, antidiabetic, anti-anxiety, anti-HIV and antidepressant. Eugenol, cinnamaldehyde, cinnamyl acetate, caryophyllene, and cinnamic acid are the major compounds present in the leaf extract of *Cinnamomum verum*. The leaf decoction is traditionally used to dissolve and expel kidney stone⁵².

***Persea gratissima* Gaertn. Fil:** *Persea gratissima* is an indigenous medicinal plant, distributed in subtropical and tropic climate. It belongs to the family Lauraceae. The leaf of *Persea gratissima* is a natural substance that have been utilized as an

antioxidant, diuretic, and anti-inflammatory due to presence of variety of active substances, including as triterpenoids, flavonoids, alkaloids, saponins and tannins. The leaf extract inhibits formation of kidney stone by inhibiting the crystallization process, the second step of urinary stone formation⁵³.

***Persea americana* Mill:** *Persea americana* Mill, commonly known as avocado, is an evergreen plant which is found in tropical and subtropical region of the world. It contains chemicals such as saponins, flavonoids, alkaloids and tannins. A preclinical study proved that the leaf extract of *Persea americana* is effective in the treatment of kidney stone⁵⁴. It shows antiurolithiatic activity by dissolving the stones and the efficacy of avocado leaf infusion as a kidney stone dissolver can be enhanced by increasing its dose⁵⁵. The flavonoid and phenolic compound present in leaf extract inhibits crystallization by preventing the aggregation process of crystal⁵⁶.

***Laurus nobilis* L:** *Laurus nobilis* L. is an evergreen aromatic and medicinal shrub which is native to Mediterranean regions. This plant comes under the family Lauraceae. The essential oil obtained from this plant has lots of pharmacological properties, including antibacterial, antioxidant and antifungal^{57, 58}. It is reported that the seeds contain antiulcer and antidiabetic properties. It contains volatile oil (1,8-cineole, sabinene, linalool, methyl eugenol, α -pinene, limonene, α -terpineol), monoterpenes and their oxygenated derivatives, diterpenes and esters. The infusion of bark is traditionally used as antiurolithiatic agent. Reactive oxygen species, produced due to interaction between crystal and renal endothelial cell, initiate apoptosis and kidney stone formation. *Laurus nobilis* decreases the production of kidney stones by inhibiting the inflammatory and free radicals mediated renal endothelial cell apoptosis.

***Averrhoa carambola*:** *Averrhoa carambola* is an evergreen tree grows in tropical and subtropical regions, belonging to the family Oxalidaceae. It is a very good source of natural antioxidants like L-ascorbic acid, epicatechin and gallic acid. It has been reported that the fruit of *Averrhoa carambola* contains saponin, glycosides, flavonoids (carambolaside, epicatechin, catechin, carambola-

flavone), terpenes (roseoside, cannabidiol), β -sitosterol, campesterol. It also contained the four major plant fatty acids- palmitic, oleic, linoleic and linolenic acid. Edible portion of the fruit contains dietary fibers, pectin, cellulose, hemicelluloses, minerals (phosphorous, potassium, magnesium, calcium, iron, zinc). Pharmacological studies have revealed that crude extract of this plant exhibit multiple activities such as antioxidant, antihyperglycemic, anti-inflammatory, hepatoprotective, cardioprotective, antitumor, antihypertensive activities. Numerous literatures have claimed that it has antiurothiatic activity due to presence of anthraquinone glucoside, flavonoids (quercetin-3-O- β -d- glucoside lupeol), β -sitosterol and rutin.⁵⁹ *Averrhoa carambola* prevents the formation of kidney stone by inhibiting the supersaturation of urine. It also reduces the deposition of crystal by increasing the excretion of stones due to its diuretic property⁵⁹.

***Oxalis corniculata* L:** *Oxalis corniculata* L, also known as creeping wood sorrel, is an herbaceous plant which has lots of medical importance. This medicinal plant contains some important secondary metabolites such as glycosides, β -sitosterol, ethyl gallate, apigenin, isovitexine, flavonoids, phenolic compounds, fibers, and tannins, fatty acids like palmitic acid, oleic, linoleic, linolenic and stearic acids etc., responsible for antidiabetic, wound healing, anti-amoebic, anti-inflammatory, antioxidant. It exhibits a protective effect in urolithiasis by decreasing the inflammation and preventing the renal epithelial cell damage by free radicals which increases the crystal formation⁶⁰.

***Biophytum sensitivum*:** *Biophytum sensitivum* L. has been used in the Ayurveda for its various medicinal values due to presence of bioactive constituents such as flavones (cupressuflavone, amentoflavone), flavonoids (luteolin 7-methyl ether, isoorientin, 3'-methoxyluteolin 7-O-glucoside), acids (4-caffeoylquinic acid and 5-caffeoylquinic acid)^{25, 63}. This plant is traditionally used in the treatment of renal calculi. Some in-vivo studies proved that the whole plant extract of *Biophytum sensitivum* decreased and inhibited the development and formation of urinary stones^{61, 62}. It reduces the level of stone-forming components, increases the elimination of stones due to diuretic effects. It also acts as free radical scavenger due to

its antioxidant activity. Besides this antiurothiatic property is attributed to its nephroprotective potential.

CONCLUSION: This review delves into the multifaceted realm of urolithiasis, shedding light on the fundamental aspects of kidney stones, encompassing their prevalence rates, etiological factors, and contemporary treatment modalities. Focusing on the Lauraceae and Oxalidaceae plant families, this exploration extends beyond the conventional medical approaches, delving into the rich tapestry of phytochemicals inherent in these plants. By meticulously examining their scientific nomenclature and traditional applications, we unearth a treasure trove of holistic remedies that have been historically employed in the management of urolithiasis.

The integration of traditional wisdom with contemporary scientific understanding provides a nuanced perspective on the potential efficacy of these plant-derived compounds. This synthesis of knowledge not only enriches our understanding of alternative therapeutic avenues but also underscores the importance of exploring nature's pharmacopeia in addressing urolithiasis. It has navigated the intricate interplay between traditional wisdom and modern science, this review serves as a valuable resource for researchers, healthcare practitioners, and enthusiasts alike.

By presenting a balanced amalgamation of historical insights and scientific evidence, we pave the way for future investigations into the untapped potential of Lauraceae and Oxalidaceae plants in the realm of urolithiasis management. This endeavor not only expands the horizons of medicinal research but also emphasizes the significance of a holistic approach in addressing health challenges.

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