



**KALANCHOE PINNATA AND ITS REMEDIAL PROPERTIES TO TREAT KIDNEY
STONE- A LESSER KNOWN PLANT**

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ABSTRACT

Background: The prevalence of kidney stones (Urolithiasis) is affecting 12% of world population at the age of 20-30 years and it happens more frequently in men than women, but now a day's kidney stones are found in young children's at the age of 5 years also and their main cause is not drinking enough fluids and high intake of ultra-processed foods. To highlight the properties of *Kalanchoe pinnata* as herbal remedy for kidney stones.

Material and Methods: 25 research papers were selected from Pub Med, research scholar, science direct, herbal medicine and other reputed journals.

Result: *Kalanchoe pinnata* has significant ability to dissolve (calcium oxalate) that is most common element in forming stones in urinary tract and also carry lots of phytochemicals such as flavonoids, quercitrin, glycosides, carotenoids, saponin, kamferol and alkaloids. These flavonoids prevent forming of CaOx crystal and calcium oxalate deposition in renal tubules. *Kalanchoe pinnata* plant extract also reduces the size of calcium oxalate stone and has treatment and preventive action in urolithiasis. And also cure Properties such as Diuretic and Antiurolithic, anti-diabetic, anti-microbial, anti-inflammatory, anticancer, anti-ulcer, wound healing,

Antileishmanial, Anticonvulsant, Antiproliferative, Hepatoprotective, Immunosuppressive and Immunomodulatory by leaf extract of *Kalanchoe pinnata* which contain phenolics compound, tannins, terpenes, steroids, lipids, cardenolides.

Conclusion: Considering the properties of *Kalanchoe pinnata* herb, a study should be conducted to develop a product and treat kidney stone by *Kalanchoe pinnata* as herbal remedy.

Keywords- Kidney stones, *Kalanchoe pinnata*, Treatment, Flavonoids, Stone prevention, Leave
INTRODUCTION

Illness is on hike from long time on the globe. It is a big task for researchers to develop cure for every diseases. Herbs are blessing to humans. They are investigated, examined and utilize to fight with numerous diseases. Herbs that help to cure any medical condition are reviewed as medicinal. These herbs have many plant based compounds and less side effects. *Kalanchoe pinnata* also known as *Bryophyllum pinnatum*, air plant, life plant, miracle leaf, patharchatta etc. It is a medicinal plant and succulent perennial that grows 4-5 feet tall and they reproduces from leaf buds and seeds both. It seems like pendulous flower and contains fleshy dark green leaves, tall hollow stems. This is an ornamental plant and is cultivated in Indian gardens and hills of Deccan & Bengal. It is a medicinal plant and used to cure kidney stones, pulmonary infection, rheumatoid arthritis, gastric ulcers etc [1, 2]. Leaves of this plant are the combination of leaf & stem known as phylloclade and also known as glabrous glaucous perennial herb. Leaves

have irregular intersecting, the bottom normally straightforward or periodically compound, 6-8 and 8-12cm in size, the upper generally 3-5 or sometime 7- folio late, extensive sharp, the stalk joined together by a ridge round stem. Leaves are elliptical or oval shaped, scallop or flat. The leaf often produce on their scallop at the edge of the slanting nerves, buds embellish with roots, stem and leaves that will convert into the new one (new plant). This paper highlight the properties of K.P as herbal remedy for kidney stones and highlight other medicinal uses of K.P plant in Wounds, sores, scabies, urinary insufficiency, insect bites, kidney stones, indigestion, abdominal discomfort, boils, bruises, cuts, diabetes, diarrhea, dysentery, headaches, Anti-inflammatory, antibacterial, Pimples, inflammation, eczema, coughs, earaches, Menstrual disorders, fevers, chicken pox, broken bones etc. This plant is abundantly having flavonoids, phenolics compound, tannins, terpenes, glycosides, cardenolides, steroids, lipids.

Some of the Macro elements i.e. calcium, magnesium, potassium, phosphorous, sodium, Micro elements: iron, zinc, vitamins, ascorbic acid, riboflavin, thiamin, niacin. Three new constituents were isolated from *Kalanchoe pinnata* that is bryophyllol, bryophollene and bryophollenone.

Methanolic extract take out from leaves of K.P by two insecticidal bufadienolides that are bryophyllin A and bryophyllin C. This plant is accountable for antitumor activity that extracted from by five bufadienolides that are bryophollene, bryophyllin A, bryophyllin C, beraldegenin-3-acetate, bersaldegenin1,3,5-orthoacetate, daigremotianin. Amino acids are also present in the leaves i.e. thiamine, pyridoxine, ascorbic acid, cysteine, glycine, casein hydrlysate, nicotinamide. Also contain some food content i.e. proteins, lipids, minerals, carbohydrate, calcium, sodium, ferrous, lipids, phosphorous, potassium, magnesium, zinc, copper and sugars, raffinose, lactose, sucrose, glucose etc [1, 3, 4-8].

METHOD

By using main key words like “Kidney stones”, “*Kalanchoe Pinnata*”, “treatment”, “Flavonoids”, “stone prevention”, and “leaves”. This review paper has use 25 research papers they are sourced citation in both local and globe witness derived studies,

by manage repeated literature searches selected from Pub Med, research scholar, science direct, herbal medicine and other reputed journals.

RESULT

Nephrolithiasis, renal calculus, Kidney stones are most prevalent and old diseases in the urinary tract. At any stage of life people can get kidney stones even children's are also suffering from kidney stones. The incident rates of kidney stones are high in both groups' females as well as in males.

However, there is no treatment and medicine for curing kidney stones. A study conducted by Mamoori (2019) collected data from experimental trials suggests with the aim of management of renal lithiasis from different medical approach which is medicinal plants they are very effective in curing kidney stones. Over a number of decades, kidney stones have become one of the main constraints in human health universally and informs a great therapeutic threat because of the lack of real treatments and greater recurrence rates. Their review they presented confirmation on kidney stones treatment and prevention by showing efficacy of various therapeutic plants. The study stated that kidney stones are prevented and treated by Medicinal herb *Kalanchoe Pinnata*. It is very effective herb [9].

Kalanchoe pinnata contains different compounds. These compounds have their own properties which summarise in **Table 1**.

Table 1: Compounds present in Kalanchoe Pinnata

Compound	Properties
Flavonoids	Hinder the formation of CaOx stones and correlate with diuretic, anti-inflammatory, anti-bacterial properties & other protective effect.
Quercitrin	Effective for preventing stone forming diseases and decrease CaOx crystal deposition in renal tubules.
Phenolics	More effective in dissolving calcium phosphate stones than oxalate one.
Kamferol	Inhibit effect on crystallization, nucleation and aggregation of crystals.
Glycoside	Prevent damage in kidneys and also decrease urinary disorders.
Steroids	It will help in reduction time of stone passage from urine.

(Source: Zeng, 2019 [10]; Zhu, 2014 [11]; Byahatti, 2010 [12]; Nirumand, 2018 [13]; Yadav, 2016 [14]; Nouri, 2017 [15])

Kalanchoe pinnata has significant ability to dissolve (calcium oxalate) that is most common element in forming stones in urinary tract [16]. The leaves contain lots of phytochemicals such as flavonoids, quercitrin, glycosides, carotenoids, saponin, kamferol and alkaloids. These flavonoids prevent forming of CaOx crystal and calcium oxalate deposition in renal tubules. This plant also reduces the size of calcium oxalate stones and has treatment & preventive action in urolithiasis [17].

A research conducted by Sohgaura (2018) discovered the calcium oxalate (CaO_x) crystal growth inhibition potential of *Kalanchoe Pinnata*, rich in polyphenols and flavonoids. From the hydromethanolic extract of *E. officinalis*, *B. nutans*, *K. Pinnata* and *C. dactylon* ethyl acetate was separated and quantitative analysis is done for total polyphenols & flavonoids content present in

leaves. For the inhibition of CaO_x crystals growth in all ethyl acetate fractions, sodium oxalate is induced in all plants with proper screening [18].

Another study conducted by Fernandes (2019) in which *Kalanchoe pinnata* leaves were used for their Diuretic and Antiurolithic activity. Test was conducted on extract of leaves for checking phytochemicals content which include phenolic compounds, saponin and flavonoids. Two analyze conditions were studied in given research which is aggregation assay and crystal nucleation. Alcoholic extract of *Kalanchoe pinnata* which has inhibitory prospective is tested for CaOx Crystal formation which is present in nearly all kidney stones. By using Spectrophotometric method aggregation and nucleation of CaOx crystals were individually calculated. Result showed that inhibition of crystal formation and

aggregation by alcoholic extract of *Kalanchoe pinnata* leaves which have ability to do it [19].

A research was done on alcoholic or aqueous extract of *Kalanchoe pinnata* leaves (*Bryophyllum pinnatum* leaves) which has renal protective properties. From Nigeria against gasoline vapor induced toxicity in the kidneys of male albino rats. Clearly, 50 healthy 8-week-old male albino rats weighing between 165 g and 185 g were randomly divided into five groups of ten animals each. Group 1 was presented as a control and was not treated with *Bryophyllum pinnatum* extract or exposed to gasoline vapor. Group 2 was presented as a negative control and was exposed to petrol vapor but was not treated with the *Bryophyllum pinnatum* leaf plant extract. Groups 3, 4 and 5 were treated with the plant extract at 20 mg / kg body weight, 40 mg / kg body weight, 60 mg / kg body weight respectively and were exposed to petrol vapor for 5 hours, every day for 21 days. The results show that the average body weight of the treated animals increased significantly compared to the negative control. Hematological parameters; PCV, Hb, total bilirubin, white blood cells and red blood cells are increased, while the biomarkers of renal function Na⁺, Ca²⁺, Mg²⁺ and Cl⁻ are also increased in treated

animals compared to the negative control, respectively. The effect of the plant extract depends on the dose. The results show that plant extract has renal protection potential in experimental animals [20].

A realization survey by Salauniyan (2015) assesses the agreement of lithiasis contrary to the ethanolic concentration of the whole *Bryophyllum pinnatum* or *Kalanchoe pinnata* plant. Urolithiasis, nephrolithiasis or kidney cancer etc. It is an infection caused by the research and the effect of urolithiasis (calculars) or calculi or extortionate events of precious stones in the urinary tract. This type of illness or sickness is suggested by many names which include urinary calculi, bladder stones, cystitis, or urethritis. The ethanolic extract of the *Bryophyllum pinnatum* plant is the expression of an antilithic accuracy in rodents in ethylene glycol (0.75 (v / v)), if used in particular for the causal cause. Lithiasis action on treatment has serious opponent on segments which shows marked arise in phosphorus, oxalates, calcium and creatinine in blood serum level saw in lithiasis (100 and 200 mg/kg). The 300 mg / kg portion of extract caused equally to professional instrumentation of phosphorus, calcium oxalates and creatinine in blood serum level result exposed insignificant. Ethanol split was discovered captivating with

that reference standard from antilithiatic effect of plant [21].

Another studies and researches also showed the same results in curing kidney stones from *Kalanchoe pinnata* leaves extract [22-25].

CONCLUSION

The focus of the study will help us to understand the positive impact of uses of *Kalanchoe pinnata* herb specially leaves can prevent and treat medical condition like Kidney stone, which is increasing day by day in younger population because of sedentary life style and unhealthy eating patterns. Considering the properties of *Kalanchoe pinnata* herb, a study should be conducted to develop a product and do clinical trials to prevent and treat kidney stone by *Kalanchoe pinnata* as an herbal remedial treatment.

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Author- Paper writing

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