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**Dr. AK Mohite**

Department of Botany,  
S.S.G.M. Science Gautam Arts  
and Sanjivani Commerce  
College, Kopergaon,  
Maharashtra, India

**PW Dahale**

Department of Botany,  
S.S.G.M. Science Gautam Arts  
and Sanjivani Commerce  
College, Kopergaon,  
Maharashtra, India

**Corresponding Author:****Dr. AK Mohite**

Department of Botany,  
S.S.G.M. Science Gautam Arts  
and Sanjivani Commerce  
College, Kopergaon,  
Maharashtra, India

## Biomedical assay of *Tridax procumbens* Linn and *Hibiscus schizopetalus* Linn for treatment of kidney stones

**AK Mohite and PW Dahale****DOI:** <https://www.doi.org/10.33545/26649926.2025.v7.i6b.359>**Abstract**

Kidney stone is a common disorder in males than females. Kidney stones forms when urine contains more crystal forming substances such as calcium, oxalate and uric acid. Symptoms of kidney stones are nausea, fever, blood in urine, severe pain in back, frequent urination, sweating, cloudy or foul smell in urine. Medicinal plants helps to dissolve and pass the kidney stones. Main objective of this study is used to compare the effects of *Tridax procumbens* and *Hibiscus schizopetalus* against stone formation by nucleation assay method. Parts used were leaves of *Tridax procumbens* and petals of *Hibiscus schizopetalus*. *Tridax procumbens* exhibited better results than *Hibiscus schizopetalus*. This study will help to decrease the side effects caused by other treatments. This study helped to search new herbal plants for the treatment of kidney stone such as *Hibiscus schizopetalus*.

**Keywords:** Kidney stone, Medicinal plants, *Tridax procumbens*, *Hibiscus schizopetalus*, Nucleation assay

**Introduction**

A large number of people are suffering from urinary stone problem all over the globe. Not only the humans but animals and birds also suffer from the urinary stone problem. The occurrence in some areas is so alarming that they are known as stone belts. Stone are more common in males than in females. Most urinary calculi occur in patients aged 20-49 years.

*Hibiscus rosa-sinensis* Linn (Malvaceae) is a glabrous shrub widely cultivated in the tropics as an ornamental plant and has several varieties with varying colours. In medicine, however, the red flower variety is preferred. The herb *Hibiscus rosa-sinensis* Linn may emerge as a major player in the growing field of herbal health supplements and medicines both in daily self care and in professionally managed health care system (Nirmaladevi *et al*;2012) <sup>[8]</sup>.

Strategies of dietary supplementation for preventing calcium oxalate stones formation- Intake of oxalate-rich foods should be limited. Some items are oxalate rich in food such as spinach, rhubarb, beets, nuts, chocolate, tea, wheat bran, and strawberries which have been shown influence for raising oxalate levels and significant increase in urinary oxalate excretion. It is well-known that vitamin C can convert to oxalate therefore; supplementation of higher dose vitamin C may induce to increase oxaluria and increased risk of stone formation. Excess of fluid intake, restricted sodium and protein intake are advisable. Calcium intake during meal time is advised in order to avoid calcium oxalate (Phatak and Hendre 2015) <sup>[11]</sup>.

Several plants have been subject to scientific studies in Morocco & around the world to evaluate the litholytic activity in an in-vitro system like: *Herniaria hirsute*, *Zea mays*, *Ammi visnag*, *Zizyphus lotus* L (Yachi 2018) <sup>[7]</sup>.

Traditional treatments are very beneficial to cure diseases like renal tract infections. Urinary stones are crystals in the form that can be found anywhere, in the urinary tract, this condition is called urolithiasis. Kidney stones are a lump of crystals that are present in one or both kidneys with different sizes & shapes. Phosphate, uric acid, magnesium ammonium phosphate and struvite all contribute to the crystallization of urinary stones. Urinary stones have a calcium content of 75%, calcium oxalate of 5%, and calcium phosphate of 5%. (Amjad *et al*; 2023) <sup>[4]</sup>.

Ethno medicines are herbal substances that are used to treatment of different diseases. Approximately 25% of the drugs prescribed globally are originated from ethno medicinal plants. They are found in various essential medicines in the World Health Organization (WHO), Out of 252 drugs, 11% medicines are originated from exclusively plant. There are various treatment of approaches for kidney stones such as percutaneous nephrostolithotomy, ureteroscopy, laproscopic and shock wave lithotripsy. Hence these treatment methods are non-convenient for patients because they are costly and painful. The herbal remedies and herbal medicine which are quite safe, cost effective, readily available, and minimal or no side effects, and easily affordable (Bishoyi and Tripathy 2023) <sup>[13]</sup>.

### Materials and Methods

Collection and extraction of plant sample- The leaves of *Tridax procumbens* and fresh flowers *Hibiscus schizopetalus* were collected from botanical garden of R.B.N. Borawake College. Leaves and petals of flowers were dried at room temperature, pulverized in a mixer grinder, powdered, sieved and stored in refrigerator. For aqueous extract preparation, 1g of dried powder of *Tridax procumbens* were placed in 100ml of distilled water and boiled for 6 hours and it was filtered through Whatman No. 1 filter paper and centrifuged at 2500 rpm for 1 minute. The supernatant was concentrated and finally 1g material was extracted in 25 ml of distilled water. Same extraction process was carried out for *Hibiscus schizopetalus*.



*Hibiscus schizopetalus*

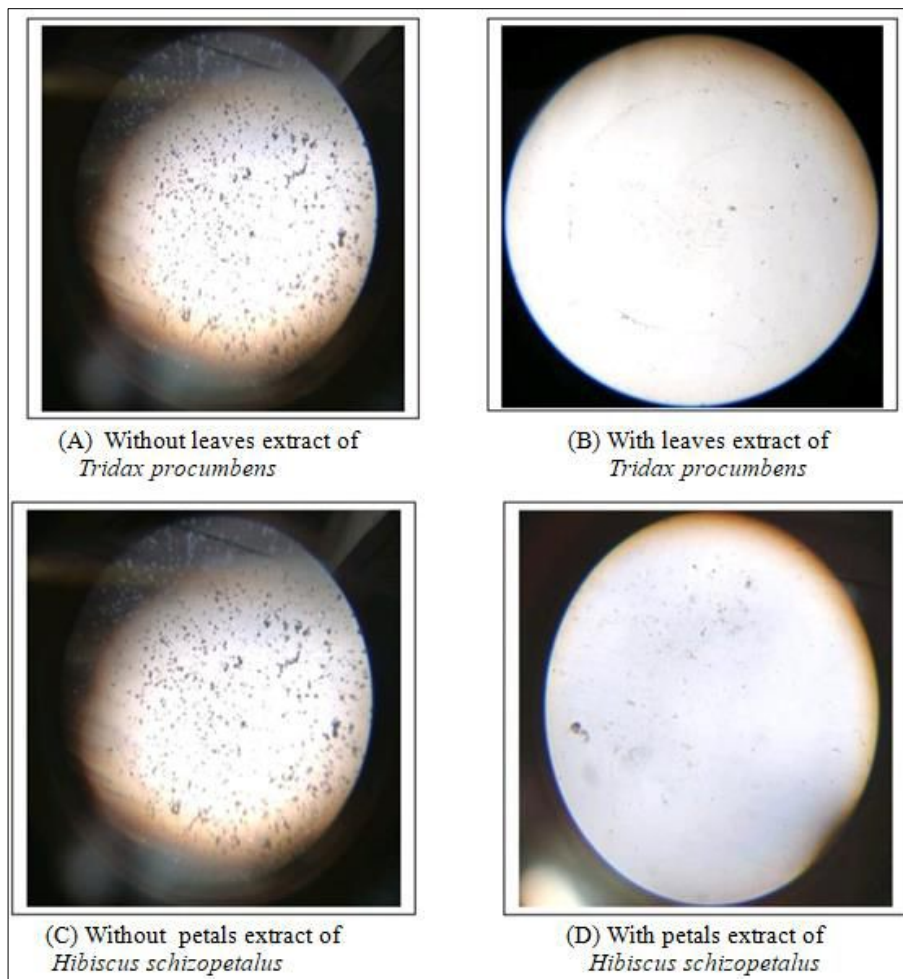


*Tridax procumbens*

Nucleation assay - Nucleation assay was done according to Nirmaladevi *et al* (2012) <sup>[8]</sup> with some modification. Nucleation assay is important in stone formation. Solutions of calcium chloride and sodium oxalate were prepared at a final concentration of 3 mmol/L and 0.5mmol/L respectively, in a buffer containing Tris 0.5mmol/L and NaCl 0.15 mmol/L at pH 6.5. Calcium chloride (950μl) solution was mixed with 50 μl of the extracts separately with different concentrations. Crystallization was initiated by the addition of 950 μl of sodium oxalate solution. The optical density of the solution was monitored at 620nm. The rate of nucleation was estimated by comparing the induction time in the presence of the extracts and in the absence of the extracts. The Ca Ox (Calcium oxalate) stones were observed using light microscopy for comparison.

### Results and Discussion

The results of nucleation assay are shown in figure 1. Ca Ox nucleation was monitored in the presence and absence of plant extracts using light microscope. When *Tridax procumbens* leaves extract concentration is increased, the amount of COM (calcium oxalate monohydrate) particles decreased and those of COD (calcium oxalate dehydrate) gradually increased. This indicates the inhibition of crystal nucleation. When *Hibiscus schizopetalus* petals extract concentration is increased, the amount of COM particles little decreased and those of COD little increased, indicating the inhibition of crystal nucleation. This study shows that higher concentration of *Tridax procumbens* leaves extract inhibits the formation of COM and promotes the formation of COD and is more effective than *Hibiscus schizopetalus*.

**Table 1:** Observation Table

| Sr. No. | Scientific Name               | Family     | Parts Used | Therapeutic Effect | Effect of extract |
|---------|-------------------------------|------------|------------|--------------------|-------------------|
| 1.      | <i>Tridax procumbens</i>      | Asteraceae | Leaves     | Kidney stone       | Better            |
| 2.      | <i>Hibiscus schizopetalus</i> | Malvaceae  | Petals     | Kidney Stone       | Good              |

### Conclusion

The study revealed that *Tridax procumbens* leaves exhibited better effect against crystal nucleation growth. *Hibiscus schizopetalus* also exhibited good effect. Therefore, the components present in both the extracts are beneficial for medicinal use in treatment of kidney stones.

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