IJPS INTERNATIONAL JOURNAL OF PLANT SCIENCES
Volume 8 | Issue 1 | January, 2013 | 163-165

RESEARCH ARTICLE

Scoparia dulcis L. as a remedy for urolithiasis

■ T.V. BINU AND B. VIJAYAKUMARI

SUMMARY

Urinary tract and kidney stone ailments have affected human beings since antiquity. The occurrence of these stones has been increasing in rural and urban societies. A large population of India suffers from urinary tract and kidney stones, formed due to deposition of calcium, phosphates and oxalates. Antiurolithiatic studies were done with two assays, namely nucleation assay and aggregation assay. CaOx crystals were grown in the *in vitro* technique. The effect of root and shoot extracts of *Scoparia dulcis* L. was studied on the growth and inhibition of CaOx crystals. By comparing the activities of the two extracts shoot and root, the greater antiurolithiatic activity was shown by root sample with a concentration of 500 µl.

Key Words : Urinary tract and kidney stone, Antiurolithiatic, *In vitro* technique, *Scoparia dulcis* L.

How to cite this article : Binu, T.V. and Vijayakumari, B. (2013). *Scoparia dulcis* L. as a remedy for urolithiasis. *Internat. J. Plant Sci.*, **8** (1) : 163-165.

Article chronicle : Received : 02.10.2012; **Revised :** 20.11.2012; **Accepted :** 27.11.2012

Plant kingdom is an everlasting reservoir of wonderful molecules with varying biological activities. Many higher plants accumulate extractable organic substances in quantities sufficient to be economically useful as chemical feed stocks or raw materials for various scientific, technological and commercial applications. It is very painful and a proper cure is very much needed to get rid of the problem. Though treatment has been revolutionized by the development of non-invasive methods, but it carries the factors like high cost, availability and side effects. As no suitable medical therapy is available for such stones disorders, it is imperative to search for some new or less known medicinal plants, which may be a potential source for new bioactive compounds of therapeutic value. Such explorations assume tremendous significance when herbal medicine is gaining importance throughout the world. (Misra and Ashwani, 2000).

MEMBERS OF THE RESEARCH FORUM

T.V. BINU, Department of Botany, Avinashilingam Institute for Home Science and Higher Education for Women, COIMBATORE (T.N.) INDIA
Email: binuabin2011@gmail.com

Address of the Co-authors:
B.VIJAYAKUMARI, Department of Botany, Avinashilingam Institute for Home Science and Higher Education for Women, COIMBATORE (T.N.) INDIA

MATERIALS AND METHODS

Aqueous root and shoot extracts of the plant *Scoparia dulcis* L. were used for the study.

Nucleation assay (Atmani and Khan 2000) :

Solution of calcium chloride and sodium oxalate were prepared at the final concentrations of 5 mmol/L and 7.5 mmol/L, respectively in a buffer containing Tris 0.05 mol/L and NaCl 0.15 mol/L at pH 6.5. To 100 µL of herb extracts (at different concentrations 100 to 500 µg/ml), 950 µL of calcium chloride solution was mixed. Crystallization was started by adding 950 mL of sodium oxalate solution. The temperature was maintained at 37°C. The optical density of the solution was monitored at 620 nm. The rate of nucleation was estimated by comparing the induction time in the presence of extract with that of control. The growth of crystals was expected due to the following reaction.

$$CaCl_2 + Na_2C_2O_4 \rightarrow CaC_2O_4 +$$

Aggregation assay (Atmani and Khan, 2000) :

The method was described by Atmani and Khan (2000) with some minor modifications. 'Seed' CaOx monohydrate (COM) crystals were prepared by mixing calcium chloride and sodium oxalate at 50 mmol/L. Both solutions were equilibrated to 60°C in a water bath for 1 hr and then cooled to 37°C

Table 1 : Antiurolithiatic assays of root and shoot samples of *Scoparia dulcis* L.

Sr. No	Assay	Sample	Control	Concentration gradients (µl / ml)				
				100	200	300	400	500
1.	Nucleation	Root	84.73	87.33	85.59	84.25	83.37	82.77
		Shoot		85.62	82.81	83.10	81.05	78.24
2.	Growth	Root	−3.89	−16.45	−23.62	−30.23	−40.95	−48.64
		Shoot		−5.84	−10.34	−13.22	−15.61	−19.33
3.	Aggregation	Root	−125.93	−182.21	−189.67	−229.23	−238.33	−258.73
		Shoot		−128.43	−147.09	−157.93	−158.94	−160.27
S.E.±						8.25		
C.D. (0.05)						16.53		

Table 2 : Effect of *Scoparia dulcis* L. root and shoot aqueous extracts on different stages of crystallization

Concentration (µl / ml)	(Aqueous extract)					
	Root			Shoot		
	N	G	A	N	G	A
Control	+	+	+	+	+	+
100	+	+	+	+	+	+
200	+	+ –	+ –	+	+	+
300	+ –	+ –	+ –	+	+	+
400	+ –	–	–	+ –	+ –	+ –
500	–	–	–	+ –	+ –	–

+ → Action on the stage N – Nucleation, + – → More / less action on the stage G – Growth, – → No action on the stage A – Aggregation

overnight. The crystals were harvested by centrifugation and then evaporated at 37°C. CaOx crystals were used at a final concentration of 0.8 mg / ml, buffered with Tris 0.05 mol/L and NaCl 0.15 mol/L at pH 6.5. Experiments were conducted at 37°C in the absence or presence of the plant extract after stopping the stirring. The percentage aggregation inhibition rate was then calculated by comparing the turbidity in the presence of the extract with that obtained in the control using following formula :

$$\mathbf{Ir} = \left(\mathbf{1} - \frac{\mathbf{Turbidity}_{\mathbf{Sample}}}{\mathbf{Turbidity}_{\mathbf{Control}}}\right)\mathbf{x100}$$

RESULTS AND DISCUSSION

By comparing the activities of the two extracts shoot and root, the greater capacity to reduce all the crystallization process is shown in root sample with a concentration of 500 µl (- 258.73 µl/ml). The higher concentrations of herb extracts were associated with fewer crystals, and the size decreased proportionally (Table 1).

Similar result was obtained in fruit extracts of *Solanum xanthocarpum* Schrad and Wendl. and *Pedalium murex* Linn. by Patel *et al*. (2010). The present finding is in accordance with the findings of Patel *et al*. (2011) who evaluated the potency of different extracts of seeds of *Elettaria cardamomum*.

From the present findings it is indicated that root extract had more potency to inhibit crystallization (Table 2). Chauhan *et al*. (2011) inferred that magnesium acetate (1.0 M) prepared with 0.0 per cent, 0.5 per cent and 1 per cent concentrations of the extract showed high dissolution rate and fragmentation of struvite crystals.

REFERENCES

Atmani, F. and Khan, S.R. (2000). Effects of an extract from *Herniaria hirsute* on calcium oxalate crystallization *in vitro*, *BJU Internat.*, **85** : 621-625.

Chauhan, C.K., Joshi, M.J. and Vaidya, A.D.B.(2011). Growth inhibition of struvite crystals by the aqueous root extract of *Rotula aquatica*, *Indian J. Biochem.& Biophys.*, **48**: 202-207.

Misra, A. and Ashwani, K. (2000). Studies on ayurvedic drugs for the cure of urinary tract stones, *J. Indian Bot. Sco.*, **79**: 47-48.

Patel, M.A., Patel,P.K. and Seth, A.K. (2011). Effect of seed extracts of *Elettaria cardamomum* on calcium oxalate crystallization, *Internat. J. Pharmacy Res.& Technol.*, **1** (1): 21-25.

Patel, P.K., Nayak, N., Patel, H., Patel, M.A., Saralai, M.G. and Gandhi, T.R. (2010). Inhibition of calcium oxalate crystallization by the fruit extracts of *Solanum xanthocarpum* Schrad. And Wendl. and *Pendalium murex* Linn, *Internat. J. Pharmaceutical Res.*, **2** (4) : 46-52.

****
*****