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EVALUATION OF *IN VITRO* ANTI UROLITHIATIC ACTIVITY OF *SENNA OCCIDENTALIS*

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Abstract:

The present study was explores that evaluation of in vitro antiurolithiatic activity of Senna occidentalis. It was observed that thehighest calcium oxalate crystals dissolution was observed in the ethanolic extract of Senna occidentalis. It was found that ethanolic extract of Senna occidentalis has more efficient to dissolve calciumoxalate. In this study Neeri was used as standard drug.

Key words: ***Senna Occidentalis,*** *urolithiasis and Ethanolic extract*

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INTRODUCTION:

Kidney stones are a common cause of blood in the urine and pain in the abdomen, flank, or groin. Kidney stones occur in 1 in 20 people at some time in their life. The development of the stones is related to decreased urine volume or increased excretion of stone-forming components such as calcium, oxalate, urate, cystine, xanthine, and phosphate. The stones form in the urine collecting area (the pelvis) of the kidney and may range in size from tiny to staghorn stones the size of the renal pelvis itself. The process of stone formation, urolithiasis, is also called nephrolithiasis.

The worldwide incidence of urolithiasis is quite high, and more than 80% of urinary calculi are calcium oxalate stones alone or calcium oxalate mixed with calcium phosphate [1]. However, the presence of certain molecules raise the level of supersaturation of salts needed to initiate crystal nucleation or reduce the rate of crystal growth or aggregation and prevents stone formation [2]. Calcium oxalate stones represent up to 80% of analyzed stones [3]. Calcium phosphate account for 15-25%, while 10-15% is mixed stones. The others are struvite 15-30%, cystine 6-10%, and uric acid stones 2-10% [4]. Calcium oxalate stones are of primary two types, calcium oxalate monohydrate (whewellite) and calcium oxalate dihydrate (weddellite). The occurrence frequency of whewellite is 78% while that of weddellite is 43% [5].Though technological advancements have made dramatic improvement in the removal of urinary stones still some of the drawbacks of these methods exists which includes their being too costly for a commonman and recurrence of stone formation along with anumber of other side effects [6]. Many medications and remedies have been used during the past many years to treat urinary stones. Endoscopic stone removal and extracorporeal shock wave lithotripsy have revolutionzed the treatment of nephrolithiasis, but do not avoid the possibility of new stone formation [7]. Various therapies including thiazide diuretics and alkalicitrate are being used in an attempt to prevent the recurrence of hypercalciuria and hyperoxaluria induced calculi,but scientific evidence for their efficacy is less convincing [8].

Medicinalplants have played as significant role in various ancient traditional system of medication.Even today, plants provide a cheap source of drugs for majority ofworlds population. Several pharmacological investigations on the medicinal plants used in traditional antiurolithiatic therapy have revealed their therapeutic potential in thein-vitro or in-vivo models [9].

Sennaoccidentalis is an erect foetid annual herb. It belongs to the family Fabaceaeandcommonly called as coffee Senna and in English; it is called as septic weed. It grows up to60 to 150 cm in height and it is found throughout India up to an altitude of 1500 cm. Sennaoccidentalis has many traditional to treat typhoid, malaria, dog bites. It has pharmacologicalactivities like antihelmintic [10] antifungal, antimutagenic, antipyretic and antifeedant. In this article we present a Anti Urolithiatic activity of Ethanolic extract of *Senna occidentalis by using Titrymetry method.*

MATERIALS AND METHODS:

Plant Materials

The leaves of Sennaoccidentalis were collected from Khagazmaddur (Vil), Narsapur (Mdl), Medak (Dist) of Telangana in the month of August 2017. The plantwasauthenticatedby D. VenkateshwaraRao, DeputyDirector, Telangana. Forest Academy, Dullapally, Hyderabad, Rangareddy District. Theleaves were washed with tap water and dried under shade.

Preparation of Plant Extract

The leaves of plant were dried under shade and crushed in pulveriser and powdered. Thesepowdered plant material was extracted with Ethanol in a soxhlet apparatus for 72hours. After complete the extraction, the extracts were cooled at room temperature andfiltered and evaporated to dryness using rotary evaporator.

Chemicals Used

Neeri, Sodium oxalate, Tris buffer, calcium chloride, Potassiumpermanganate (KMnO4), Sulphuricacid (H2SO4).

Investigation of *In Vitro* Antiurolithiatic Activity Test by Titrimetry

The experimental kidney stones of calcium oxalate (CaOx) were prepared in thelaboratory by taking equimolar solution of calcium chloride dehydrate in distilled waterand sodium oxalate in 10 ml of 2N H2SO4. Both were allowed to react in sufficientquantity of distilled water in a beaker, the resulting precipitate was calciumoxalate. Theprecipitate was freed from traces of sulphuric acid by ammonia solution, washed withdistilled water and dried at 60˚C. The dissolution percentage of calcium oxalate wasevaluated by taking exactly 1 mg of calcium oxalate and 10 mg of the extract, packed ittogether in semipermeable membrane of egg as shown in the model designed given below. This was allowed to suspend in a conical flask containing 100 ml of 0.1M Tris buffer. First group served asblank

containing only1 mg of calcium oxalate. The second groupserved as positive control containing 1 mg of calciumoxalate and along with the 10mgstandard drugs, i.e. Neeri. The 3rdgroup along with 1 mg of calcium oxalate contain Ethanolicextracts. The conical flasks of all groups werekept in an incubator preheated to37 ^{0}C for 2 h. Remove the contents of semipermeablemembranes from each group into separate test tubes, add 2 ml of 1Nsulphuricacid toeach test tube and titrated with 0.9494 N KMnO4 till a light pink colour end pointobtained. The amount of remainingundissolved calcium oxalate is substracted from thetotal quantity used in the experiment in the beginning to know the total quantity ofdissolved calcium oxalate by various solvent extracts[11].

RESULTS AND DISCUSSION:

In the present study, Titrymetry method was used to assess the antiurolithiatic activity of Ethanolic extract of Senna occidentalis. The dissolution percentage, i.e. 51% of calcium oxalate (CaOx) dissolution was observed in Ethanolic extract. From this study, it was observed that Ethanolic extract of Sennaoccidentalis leaves showed antiurolithiatic activity. This study has given primary evidence for Sennaoccidentalis the plant which possesslithotriptic property. This in vitro studyhas given lead data and shown that Ethanolic extract of Sennaoccidentalis is quite promising for further studies in this regard.

Table 1: Shows % dissolution of calcium oxalate (CaOx) by in vitro anti urolithiatic activity of Senna Occidentalis leaves extracts.

	% of dissolution of calcium oxalate	
Sl.No.	**Groups**	**Senna Occidentalis**
1.	Blank	0
2.	Positive control	81
3.	Ethanol extract	51

Figure 1(a): Decalcification of egg shell in 10% Acetic acid overnight.

Figure 1(b): Decalcified Eggs

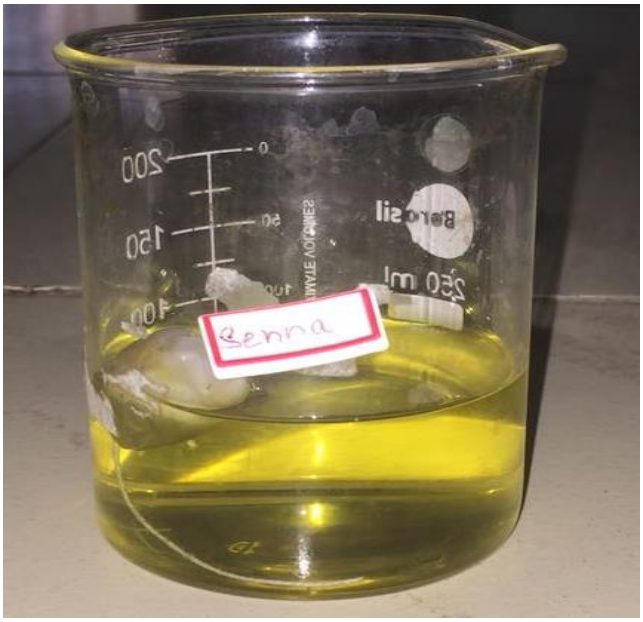

Figure 1(c): Egg membrane along with the contents suspended into the 0.1 M Tris buffer.

Figure 1: In vitro experimental model setup to evaluate antiurolithiatic activity

CONCLUSION:

In the present work, the dissolution of calcium oxalate crystals by Ethanolic extract of *sennaoccidentalis*was studiedby using the standard drug, cystone. The work was performed by using in vitro antiurolithiatic model for calculating percentage dissolution of kidney stone. This study has given primary evidence for Sennaoccidentalis as the plant which possess antiurolithiatic property.

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