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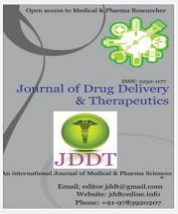

Open Access Research Article

EFFECT OF ETHANOLIC EXTRACTS OF *ABUTILON INDICUM, ZEA MAYS* AND COMBINATION ON CALCIUM OXALATE UROLITHIASIS IN RAT

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ABSTRACT

In the present study the effect of calcium oxalate urolithiasis urinary risk factor of ethanolic extract of *Abutilon indicum, Zea mays* and their combination have been studied in albino rats. From this study it is deduced that the possible effect of the ethanolic extract of *Abutilon indicum, Zea mays* and their combination can be assigned to be positive effect on the main urolithiasis risk factors.

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INTRODUCTION:

Urinary stone disease continues to reside in an important place in daily urological practice. The average life time risk of stone formation has been reported in the range of 5-10 %. A predominance of men over women can be observed with an incidence peak between the fourth and fifth decade of life[1]. Urinary stone disease is a common disorder estimated to occur in approximately 12% of the population, with a recurrence rate of 70–81% in males, and 47–60% in females. Occurrence of urolithiasis requires formation of a nidus, its retention and growth in the urinary tract which may cause obstruction of the ureter. *Abutilon indicum* species has been widely used as medicine in Ayurvedic system of medicine. *Abutilon indicum* (Malvaceae), commonly known as "Thuthi" is distributed throughout the hotter parts of India. *Abutilon indicum* commonly known as "Atibala" in Sanskrit gives excessive tonic strength. Phytoconstituents like β-Sitosterol (0.2%), tocopherol oil (0.3%) were isolated[2]. The word *zea mays* come from two languages. Zea comes from ancient Greek and is a generic name for cereal and grains. In traditional medicine, corn is used for relieving diarrhea, dysentery, urinary tract disorder, prostatitis, lithiasis, angina, hypertension and tumor[3].

MATERIALS AND METHODS:

Description of plant

Abutilon indicum The botanical name of atibala is *Abutilon indicum* and it belongs to family Malvaceae. The plant grows throughout India and in Sri Lanka, at about an elevation of 1000-1, 500 metres. The perennial shrub grows 1.25-2 meters in height. Plant covered with minute hairs. Leaves are alternate, cordate and acute. The leaves are oblong, opposite, toothed, smooth and covered with fine white hair. The flowers are yellow, 2.5 cm in diameter. *Zea mays*: The word *zea mays* come from two languages. Zea comes from ancient Greek and is a generic name for cereal and grains. In traditional medicine, corn is used for relieving diarrhea, dysentery, urinary tract disorder, prostatitis, lithiasis, angina, hypertension and tumor.

Pharmacological studies

Anti-urolithiatic activity[4]

Experimental design

Animal 6 groups and each group having 5 albino rats weighing 120-180 gm. were selected and housed under standard laboratory condition for a period of 14 days prior to the experiment. Experimental protocols were approved by our Institutional animal ethical committee, which follows guidelines of CPCSEA/ IAEC (Committee for the purpose of Control and Supervision of Experiments on Animals/Institutional Animal Ethics Committee).

Model Ethylene glycol induced model

Standard drug Cystone tablet 500 mg/kg body weight

Method 0.75% ethylene glycol induced kidney stone

Experimental group

Six groups contain 5 animals in each group were subjected to 0.75% ethylene glycol into drinking water for four weeks.

Group i: control group received only drinking water.

Group ii: model control group received drinking water + 0.75% ethylene glycol

Group iii: received drinking water +0.75% ethylene glycol + *abutilon indicum* extract 500 mg/kg

Group iv: received drinking water + 0.75 % ethylene glycol + *zea mays* extract 200mg/kg

Group v: received drinking water +0.75 % ethylene glycol + combination of both extract

Group vi: Received drinking water +0.75 % ethylene glycol + Standard drug 500 mg/kg

Statistical analysis

Standard evaluation was done using one-way analysis of variance (ANOVA) Statistical significance was set at $P< 0.001$. Results are presented as mean ± standard errors (S .E.).

Parameter

Total urinary volume

Animals were placed in separate metabolic cages 24 hours before the surgery. Total urinary volume was measured, by using measuring cylinder, and reported in ml

Test for acidity

Uric acid crystals were found to deposit most frequently in the concentrated acid urine. Thus the acidity of the urine was tested using pH meter**.**

Biochemical parameter of urine

Urinary concentration of calcium, oxalate and cretinine were measured. Urinary oxalate was estimated according to the method described by Hodgkinson et al. 1 ml of urine was acidified by concentrated HNO_3 to solubelize crystals and then adjusted to pH 7 by NaOH in the presence of color indicator, the bromothymol blue. About 2 ml of saturated $CaSO_4$ and 14 ml of pure ethanol were added to precipitate oxalate overnight. The sample were centrifuged at 450 X g for 10 min and then filtered on filter paper. The precipitate obtained was solubelize in 10 ml of water acidified by 2 ml concentrated sulfuric acid. The sample were titrated by a solution of $KMnO_4$.Calcium analysis was performed by using a merck thermo spectronic U.V. double beam spectrophotometer equipped with a Varian hollow cathode and a deuterium background corrector. Creatinine was estimated based on principle, the production of an orange colour by the interaction of Creatinine with alkaline sodium pirate. The colour produced was compared in a colorimeter, and the Creatinine content of the urine estimated by comparison with a Creatinine solution of known concentration[5].

RESULTS AND DISCUSSION:

Percentage Yield of Extracts (%w/w)

Percentage yield (% w/w) of ethanolic extract of *Abutilon indicum* was found to be 12 % w/w. and ethanolic extract of *Zea mays* was found to be 10 %w/w.

Qualitative chemical evaluation

Ethanolic extract of *Abutilon indicum* showed the presence of amino acid, glucose, fructose, lutelion, carbohydrate glycoside, quercetion, Tannins, Pheniolic, and flavonoid.

Ethanolic extract of *Zea mays* showed the presence of alkaloids, glycoside, Carbohydrates, tannins, flavonoid, Saponin and steroid.

Anti-urolithiatic activity

The changes in the urine parameters in the experiment animals during the study are presented. The urine concentration of oxalate, calcium and Creatinine were increased significantly in animals administered with 0.75 percentage ethylene glycol. Four weeks treatment with ethanolic extract of *Abutilon indicum* significantly decreased urine concentration of oxalate (3.43 ±0.04), calcium (2.83±0.12) and creatinine (4.12 ± 0.06) as compared to model control (oxalate – 10.26 ± 0.09, calcium – 7.78± 0.19, creatinine – 6.79 ± 0.12) **.**The concentration of oxalate (3.55± 0.04), calcium (3.22±0.08**)** and creatinine (4.36 ± 0.08) of group IV treated with ethanolic extract of *Zea mays* were found to be significant as compared to model control (Group II). The concentration of oxalate (3.37 ± 0.13), calcium (2.85±0.04**)** and creatinine (4.15 ± 0.05) of group V treated with combination of ethanol extract of *Abutilon indicum* and ethanolic extract of *Zea mays* were found to be more significant as compared to group II, group III, group IV**.** Moreover the group treated with combination of the two drugs (500 mg *Abutilon indicum* + 200 mg *Zea mays*) was found to be most significant from the entire group. The percentage reduction of all parameters of urine were found more in group V (500 mg *Abutilon indicum* + 200 mg *Zea mays*) and in group VI (standard). Urinary volume significantly decreased in the animals treated with the 0.75 % of ethylene glycol. Urinary volume were increased by 229 (Group III), 226 (Group IV), 274 (Group V), 281 (group VI) percentage compared to model control group. Urinary pH significantly increased in the animals treated with the 0.75 % of ethylene glycol. Urinary pH were decreased by 23.84 (Group III), 21.69 (Group IV), 25.58 (Group V), 24.97 (group VI) percentage with compared to model control group.

From the above results it was noted that the combination (ethanolic extract *Abutilon indicum* and ethanolic extract of *Zea mays*) were most significant.

In the present study of kidney stone, after the administration of ethanolic extract of *Abutilon indicum* and ethanolic extract of *Zea mays* and their combination to the group of rats urine analysis shows that the occurrence of stone was decreased when compared to the kidney stone control group and combination

(ethanolic extract of *Abutilon indicum* and ethanolic extract of *Zea mays)* as effective as the standard group.

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