

SHORT COMMUNICATION

Antiuro lithiatic Activity of *Eysenhardtia polystachya* Aqueous Extract on RatsR. M. Perez G.,^{1*} R. Vargas S.,² S. Perez G.² and M. Zavala S.²¹Laboratorio de Investigacion de Productos Naturales, Escuela Superior de Ingeniería Química e Industrias extractivas IPN, Punto Fijo 16, Col. Torres Lindavista, CP 07700, México, D.F. México²Departamento de Sistemas Biologicos, Universidad Autónoma Metropolitana-Xochimilco, A.P. 23-181-Mexico D.F.

The aqueous extract of the bark of *Eysenhardtia polystachya* was tested for its antilithiatic and diuretic activity. The urolithiasis was induced experimentally by implantation of a zinc disc in to the urinary bladder of rats. A significant decrease in the weight of stones was observed after treatment in animals that received aqueous extract compared with control groups. This extract showed an increase in the 24 h urine volume compared with the control. © 1998 John Wiley & Sons, Ltd.

Phytother. Res. 12, 144–145, (1998)Keywords: *Eysenhardtia polystachya*; antilithiatic activity; diuretic activity**INTRODUCTION**

Eysenhardtia polystachya, commonly known as 'palo azul' belongs to the Leguminosae. It is a common herb that grows wild and abundantly in fields in Mexico. This plant is a popular folk remedy for the treatment of urolithiasis and a wide variety of urinary disorders in many areas of Puebla, Mexico and Hidalgo States. For this purpose, the natives use a decoction made from the fresh bark. A survey of the literature showed that no systematic study has been done of the above mentioned activities. The present study was undertaken to verify the efficacy of the aqueous extract of this plant as a diuretic and antilithiatic drug.

MATERIALS AND METHODS

Plant material. *E. polystachya* (Leguminosae) bark was collected near Tula in the state of Hidalgo. The material was identified by Edith Villafranca of the Departamento de Botanica of ENEP-Iztacala, UNAM, and a voucher specimen of the plant (5678) was deposited at the herbarium for reference.

Preparation of extract. Powdered bark (1 kg) was refluxed (5 h) with redistilled water (5 L). The extract was concentrated almost to dryness under reduced pressure and then allowed to evaporate to constant weight (yield 18%).

Antilithiatic activity. Rats were anaesthetized with sodium pentobarbitone (40 mg/kg, i.p.). A suprapubic incision was made and the urinary bladder was exposed.

The urine was then aspirated aseptically into a sterile vial for bacteriological examination and pH determination. Weighed zinc discs were inserted into bladders (Vermeulen, 1962).

The rats were allowed to recover for 1 week. They were divided into seven groups of ten animals each and put on different treatment schedules: Group I, normal untreated and unoperated control; group II, sham operated; group III, control (only foreign body implanted); group IV, foreign body implanted and treatment with the plant extract (25 mg/kg, p.o); group V, group IV schedule with 50 mg/kg p.o. plant extract; group VI, group IV schedule with 100 mg/kg p.o. plant extract. The Wistar rats weighing 180–220 g were housed in metabolic cages (Nalgene) with food and water *ad libitum*. The animals were observed for 8 weeks and were then killed by decapitation. The zinc disc from each rat was removed and weighed. The difference between the final and initial weight of the zinc disc gave the weight of stone deposited. For the evaluation of diuretic activity the urine was measured each 24 h (Sheth *et al.*, 1972). The results shown in the Tables are reported as mean \pm SE. Each parameter was analysed by one-way analysis of variance considering the homogeneity of variance (Student's *t*-test) (Wayne, 1992).

RESULTS AND DISCUSSION

The aqueous extract of *E. polystachya* (100 mg/kg p.o.) showed an 85.38% reduction in the stone deposition compared with the control group. With 25 and 50 mg/kg doses the reduction was found to be 19.43% and 45.32%, respectively (Table 1). The urinary bladder of the control group showed signs of inflammatory changes. The animals treated with an extract of *E. polystachya* indicated a dose dependent reduction in the severity of this change. In the 100 mg/kg extract treated group

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Table 1. Effect of aqueous extract of *E. polystachya* (EP) on the weight of bladder stones

| Treatment (mg/kg) | Increase of the wt. of stone (mg) | Reduction (%) |
|-------------------|-----------------------------------|---------------|
| Control | 20.32 ± 2.51 | — |
| EP 25 | 16.37 ± 1.76 ^a | 19.43 |
| EP 50 | 11.11 ± 2.21 ^b | 45.32 |
| EP 100 | 2.97 ± 1.03 ^a | 85.38 |

Values are mean ± SE. a $p < 0.05$, b $p < 0.001$ vs the control group.

Table 2. Diuretic activity of aqueous extract of *E. polystachya* (EP)

| Treatment (mg/kg) | Urine volume (mL/24 h) |
|-------------------|--------------------------|
| Control | 4.98 ± 0.67 |
| EP 25 | 6.03 ± 0.97 ^a |
| EP 50 | 8.32 ± 0.45 ^a |
| EP 100 | 9.82 ± 1.02 ^a |

Each value is the mean ± SE. a $p < 0.05$ vs the control group.

there was almost complete normalization. The results of diuretic activity are presented in Table 2. A dose of 100 mg/kg of the aqueous extract produced the maximum volume of urine (9.82 mL). The pH of urine was 7.8 before and 7.9 after the study. Some urine samples examined after the study contained G+ and G- organisms. The results of such animals were discarded.

The aqueous extract of the bark of *E. polystachya* significantly inhibited the formation of uroliths in a dose dependent manner. There was a considerable decrease in

the weights of stones produced by groups V and VI that received aqueous extract compared with that of group III. This extract showed an increase in the 24 h urine volume compared with the control. The observed diuretic activity may help to prevent the deposition of oxalate calculi (Aleykutty *et al.*, 1993). The present investigation showed that the plant extract markedly prevents the formation of uroliths. This confirms the use of the plant in folk medicine against urolithiasis. Further study is in progress for identification of the active constituents of the plant.

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