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Anti-ulcer activity of alcoholic leaf extract of *Pithecellobium dulce* Benth

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ABSTRACT

Ethanolic leaf extract of *Pithecellobium dulce* was studied for its anti ulcer activity in pyloric ligated ulcer model in rats. The volume of gastric juice, pH , and ulcer index were reduced significantly ($P < 0.001$) in the animals pretreated with alcoholic extract at the tested dose level. HPTLC fingerprint profile of the same extract was developed which would serve as reference standard for quality control of this extract.

Key words: *Pithecellobium dulce* , antiulcer activity, Pyloric-ligated ulcer model

INTRODUCTION

Pithecellobium dulce Benth. (Leguminosae)[1]is a small to medium sized, evergreen, spiny tree upto 18 m height, native of tropical America and cultivated throughout the plains of India and in the Andamans. It is known as 'Vilayati Babul' in Hindi and 'Kodukkapuli' in Tamil. The bark of the plant is reported to be used as astringent in dysentery, febrifuge and it is also useful in dermatitis and eye inflammation. The leaves have been reported to possess astringent, emollient, abortifiacient and antidiabetic properties. The presence of steroids, saponins , lipids, phospholipids, glycosides, glycolipids and polysaccharides have been reported in the seeds. The bark contains 37% of tannins of catechol type. Quericitin, kaempferol, dulcitol and afezilin have been reported from the leaves. Roots have been reported to possess estrogenic activity. Studies on alkylated resins from seed oil have been reported recently.

P. dulce is claimed to be useful in gastro duodenal ulcers and indigestion in folk medicine of Mexico[2]. However, the pharmacological effects need experimental evidence for their action. The aim of the present study was to evaluate the effect of alcoholic leaf extract of *P.dulce* on the prevention of gastric ulcers in rats.

MATERIAL AND METHODS

Fresh leaves of *Pithecellobium dulce* were collected from Sembulam Village at Kancheepuram District, T.N. in the month of January 2005. The plant was identified by local people of that village and authenticated by Dr. P. Jayaraman, Director, Plant Anatomy Research Centre (PARC), Chennai. A herbarium specimen of the plant was preserved in the Department of Pharmacognosy of our institute (APCP-3/ 2005) for further reference.

Preparation of alcoholic extract

The fresh leaves of *P. dulce* were washed with water, air- dried at room temperature and then reduced to coarse powder. The powdered mass of leaf was defatted with petroleum ether (60-80°c) followed by extraction with alcohol (95% v/v) for about 18 h by using soxhlet apparatus. The extract was filtered ,concentrated under reduced pressure in rotary evaporator and stored in a refrigerator

until further use (Extractive value 17.93 %w/w). The freshly prepared extract was chemically tested for the presence of different constituents using standard methods[3].Ethical clearance for performing the experiment on animals was obtained from the Institutional Animal Ethics Committee (Regd No 409/2001/CPCSEA), which follow guidelines of CPCSEA .

Screening of antiulcer activity

The anti ulcer activity[4]was evaluated using pyloric ligated ulcer model in rats. In this method, Swiss Wister rats of either sex weighing between 180-200 g were randomly distributed in three groups of six rats each. The Group I animals were administered 1% CMC (1 mL/100 g) orally which served as negative control. Group II animals were

Table 1: Anti ulcer activity of alcoholic leaf extract of *P. dulc* on Pyloric ligated ulcer model in rats

Group	Dose (mg/kg)	Gastric volume(ml)	pH	Free acidity (mEq/l)	Total acidity (mEq/l)	Ulcer index Mean ±SEM
Control (vehicle)	1 ml/100g	2.5±0.057	4.53±0.007	23.1±0.02	53.0±0.28	3.83±0.166
Ranitidine	50	1.6±0.057*	7.03±0.019*	9.20±0.01	20.20±0.17*	0.60 ± 0.083*
Ethanol extract	250	1.9±0.036*	6.60±0.005*	9.4±0.02	26.10±0.01*	1.73±0.210*

*P<0.001 when compared to control. (Student's 't' Test); n=6

treated with ranitidine (50mg/kg, p.o) for 10 days which served as positive control [5]. Group III animals were administered with alcoholic leaf extract of *p.dulce* at a dose of 250 mg/kg for 10 days orally. At the end of the 10th day after the last dose, the rats were kept for 18 h fasting and care was taken to avoid coprophagy. Animals were anaesthetized using pentobarbitone (35 mg/ kg, i p), the abdomen was opened and pylorus ligation was done without causing any damage to its blood supply.

After 4 h of pyloric ligation, animals were then sacrificed by decapitation and ulcers in the glandular portion of the stomach were scored according to the method reported by kulkarni [6]. The gastric juice was collected, centrifuged at 1000 rpm for 10 min and the volume of the supernatant was noted. The 1ml of supernatant liquid was pipetted out and diluted to 10ml with distilled water to note the pH of the solution with the help of pH meter. The total and free acidity were determined by

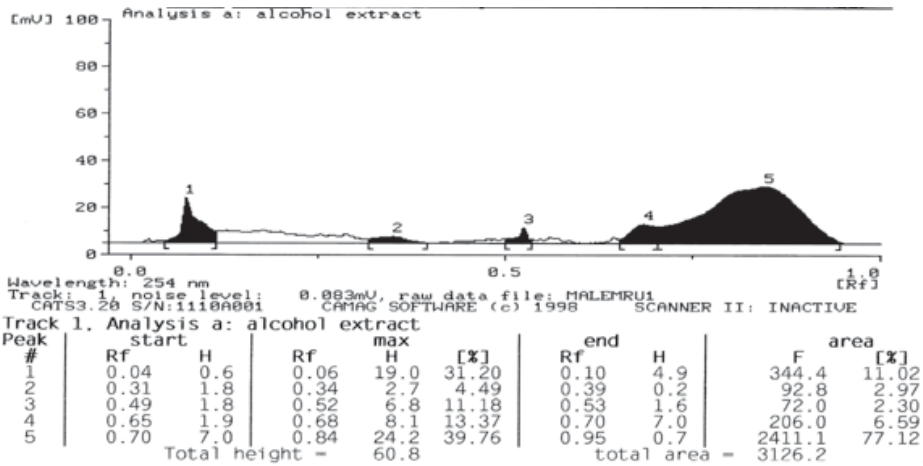

Fig. 1: HPTLC Finger printing of alcohol leaf extract of *Pithecellobium dulce* Benth

titrating with 0.01M NaoH using phenolphthalein and Topfers reagent. The total and free acids were expressed as mEq/ l. The results expressed as mean ± SEM were calculated using Student's 't' test and values P< 0.001 were considered statistically significant[7].

The suspension of alcoholic extract of *P.dulce* leaves reduced the volume of gastric juice by 24% (p<0.001), whereas ranitidine reduced the volume by 36% (p<0.001). The ulcer index reduced from 3.833 ± 0.16 to 1.73± 0.21 by the alcoholic leaf extract of *P.dulce* whereas, ranitidine prevented completely (Table 1). The acidity was also reduced by alcoholic extract from 4.53 ± 0.007 to 6.6 ± 0.005, whereas ranitidine brought the pH to neutral. HPTLC fingerprinting profile of the extract was developed (Fig 1) which would serve as reference standard for quality control of this extract .

It is likely that flavonoid compounds present in this extract may be involved for this action as flavonoids have been reported to possess significant anti-ulcer activity in various experimental models of gastric and duodenal ulceration [8]. However further studies are required to establish its exact mode of action and the active principles involved in its anti- ulcer effect.

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