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Analgesic Activity of Ethanolic Leaf Extract of *Pavetta Indica*

Golwala D. K.[1*], Patel L. D.[2], Bothara S. B.[1], Patel P. M.[3], Vaidya S. K.[1], Raval M. K.[4]

[1]*C.U. Shah College of Pharmacy and Research, Opp. IBP Petrol pump, Surendranagar- Ahmedabad highway, Wadhwan-363030, Gujarat, India*
[2]*SAL Institute of Pharmacy, Opp. Science City, Sola-Bhadaj Road, Ahmedabad, Gujarat, India*
[3]*B. M. Shah College of Pharmaceutical Education and Research, Modasa-383315, Gujarat, India*
[4]*Department of Pharmaceutical Sciences, Saurashtra University, Rajkot-360005, Gujarat, India*

ABSTRACT
The present study was designed to investigate Analgesic activity of ethanolic leaf extract of *Pavetta indica*, using hot plate method and tail clip method. Ethanolic extract was administered intraperitoneally at doses of 60 mg/kg and 80 mg/kg to Swiss albino mice and Wister rats. Ethanolic leaf extract of *Pavetta indica* showed significant ($p<0.01$) inhibition in pain response induced by thermal and mechanical stimuli in dose dependent manner. The obtained results provide promising baseline information for the potential use of these crude extract in the treatment of pain.

Keywords: *Pavetta indica*, analgesic, hot plate and tail clip method.

INTRODUCTION

Pavetta indica (Rubiaceae) is a shrub, widely distributed in India. The entire plant used medicinally as a bitter tonic, diuretic, inflammation, rheumatism, jaundice and ulcer. [1] In the indigenous system of medicine, it is reported that the decoction of the leaves are used to relieve haemorrhoidal pain, as a lotion for nose, analgesic, antipyretic, appetizer and the ulceration of mouth. [2-3]
In literature, it has been reported as an antibacterial, antiviral and antimalarial. [4] The present study was therefore aimed to explore the analgesic activity of the ethanolic leaf extract on laboratory animals.

MATERIALS AND METHODS

Leaves of *Pavetta indica* were collected from local areas of Tirunelvelly district of Tamilnadu and authenticated by the botanists. They were shade dried, finely powdered (sieve no. 40) and exhaustively extracted with ethanol in a soxhlet apparatus. The extract was evaporated to dryness under reduced pressure (40ºC), which gave brown sticky mass. Yield was 12.37 % w/w with reference to dried leaf material. The extract was reconstituted with propylene glycol as vehicle to appropriate concentrations.

***Corresponding author: Mr. Dharmesh K. Golwala,**
C.U. Shah College of Pharmacy & Research,
Opp. IBP Petrol pump, Surendranagar-Ahmedabad highway,
Wadhwan-363030, Gujarat, India **Tel.:** +91 9427664217;
Fax: +91 2752 240591. **E-mail:** golwala@hotmail.com

Animals used

Wister rats weighing 200-220 g and Swiss Albino mice weighing 18-25 g of either sex were procured from Cadila Health Care Ltd., Dholka, Ahmedabad. All the animals were kept in standard polypropylene cages and maintained under standard conditions: temperature (24±1°C), relative humidity (45-55 %) and 12:12 light:dark cycle. The animals were fed with standard rodent diet and water was given *ad libitum*. The animals were allowed to acclimatize to laboratory conditions 48 hrs before the start of the experiment. A group of 6 rats (200-220 g) were used for Hot plate - thermal stimulus and a group of mice (18-25 g) Tail clip - mechanical stimulus experiments.

Acute toxicity study

The acute toxicity was determined for the ethanolic extract of *Pavetta incida* on albino mice and Wister rats by fixed dose method of OECD Guideline no 425 given by CPCSEA respectively. [5] 300-3000 mg/kg of ethanolic extract of *Pavetta indica* was administered by oral route to mice and rats. Mortality was observed after 24 h. All the experiments were conducted after obtaining permission from the Institutional Animal Ethics Committee (IAEC) of C.U. Shah College of Pharmacy and Research, Wadhwan.

Hot plate method

Albino rats were divided into 4 groups each consisting of six animals. Group I served as vehicle control. Group II and Group III received 60 and 80 mg/kg of ethanolic extract of *Pavetta indica* respectively. All the doses were administered intraperitoneally. Group IV was treated with 10 mg/kg body

Table 1: Effect of Ethanolic extract of Pavetta indica on pain response induce by Thermal and Mechanical stimuli

Groups	Treatment	Thermal stimulus by Hot plate in rats (reaction time: second)	Mechanical stimulus by Tail clip in mice (reaction time: second)
Group I	Control (propylene glycol)	6.00 ± 0.5	2.00 ± 0.3
Group II	Ethanolic extract (60 mg/kg)	10.00 ± 0.2*	4.00 ± 0.6*
Group III	Ethanolic extract (80 mg/kg)	42.00 ± 0.8*	12.00 ± 0.7*
Group IV	Standard Morphine (10 mg/kg of rat)	33.00 ± 0.8*	---
Group V	Standard Acetyl salicylic acid (150 mg/kg of mice)	---	14.00 ± 0.5*

Data expressed as mean ± S.E.M. (n=6)
* Significantly different from control ($p<0.01$)

weight of Morphine as standard drug. After 30 min of treatment the rats were placed on a hot plate (55ºC) and the time interval between the placement of the animals and the occurrence of licking or shaking the hind paws was recorded as reaction time. The cut off time was set as 30 seconds. [6]

Tail clip test

Mice were divided into 4 groups of six each. Group I served as vehicle control. Group V treated with 150 mg/kg of acetyl salicylic acid as standard. Mice were screened by applying metal artery clip to the base of the tail with its jaws sheathed with thin rubber tubing. The pressure exerted by the clip was so adjusted that it was just sufficient to make all control mice respond. Those animals that did not show efforts to dislodge the clip within 15 seconds were excluded. [7] Ethanolic extract of *Pavetta indica*, was injected in 60 and 80 mg/kg body weight of mice, intraperitoneally 30 min before measuring the reaction time in Group II and Group III respectively.

Statistical analysis

Data were subjected to statistical analysis using ANOVA and statistical comparison was done using Turkey Kramer multiple comparison test. Values of $p<0.01$ were considered statistically significant.

RESULTS

There was no mortality observed in mice and rats i.e. extract was non-toxic up to the doses of 3000 mg/kg when administered orally. In hot plate test initial reaction times of control and Group II and Group III were recorded and they were found 6.00 ± 0.5, 10.00 ± 0.2 and 42.00 ± 0.8 seconds, respectively (Table 1). The effect of extract at 80 mg, dose level was more effectively significant to that of morphine 10 mg/kg and control group with a significance ($p<0.01$).

In tail clip test the initial reaction time in control was noted 2.00 ± 0.3seconds. The significant increase in the reaction time was observed after 30 minutes after drug administration 4.00 ± 0.6 in Group II, 12.00 ± 0.7 in Group III and 14.00 ± 0.5 in Group V ($p<0.01$). The results of tail clip test there is a marked increase retention time at 80 mg dose level (Table 1).

DISCUSSION

Thermal and Mechanical stimulus parameters were used for hot plate and tail clip tests, respectively. An increase in reaction time is generally considered and important parameter of central and peripheral analgesic activity by Non selective COX inhibition and Nociceptors. [8-9] Results of both tests are suggestive of strong analgesic effect in test drug is most probably of opioid type as the positive effect against the thermal nociceptive stimuli are indicative of opioid type of analgesic effect. [10] Further, the effect starts and attains the peak very early; it therefore, can be used in acute painful conditions. The findings validate the therapeutic use of test drug in analgesia. However further studies are essential to find the exact mechanism involved in the exerted action.

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