EVALUATION OF ANTINOCICEPTIVE POTENTIAL OF *BAUHINIA VARIEGATA* LINN. FLOWERS IN MICE

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Summary

Antinociceptive potential were examined in an ethanolic extract of the *Bauhnia variegate* linn flowers (EBVF). The analgesic effects of both doses 250 and 500 mg /kg b.w. were evaluated in mice against acetic acid induced writhings (chemically induced pain) and tail immersion method (thermally induced pain). The analgesia produced by EBVF was compared with standard analgesics aspirin (ASP 200 mg/kg, i.p) and pentazocine (PTZ 10 mg/kg, p.o). In comparison to control group EBVF showed the significant and dose dependent activity against chemically as well as thermally induced pain models. The result suggests that the EBVF of herbal origin has significant antinociceptive potential as reflected by the parameters investigated. Further investigations are, however, necessary to explore mechanism(s) of action involved in these pharmacological activities.

Key words: *Bauhinia variegata*, analgesic, writhings, tail immersion

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Introduction

A large number of Indian medicinal plants are attributed with various pharmacological activities because it contains diversified class of phytochemicals. It is believed that current analgesia-inducing drug such as opiates and non-steroidal anti-inflammatory drugs are not useful in all cases, because of its side effects and low potency. *Bauhinia variegata* Linn.(Caesalpiniaceae) is a commonly found plant in most waste ground and open plantations. It is cultivated throughout India and in the forest lands in central India. According to Ayurveda, *Bauhinia variegata* Linn is used as tonic for the liver, in treatment of leprosy, menorrhagia, impurities of blood, tuberculous glands, wounds, ulcers, asthma etc.[1,2] The bark powder of the plant is a major ingredient of the remedy prescribed to increase the white blood cells.

Phytochemical characterization shows the presence of tannins, steroids, alkaloids, flavonoids and saponin in the stem bark of *Bauhinia variegate* Linn.[3] Some studies have reported its antitumour, anti-ulcer, antibacterial, antifungal and immunomodulatory activity of *Bauhinia variegata* Linn.[4-7]. The present study was planed to explore the antinociceptive potential of the ethanolic extract of *Bauhinia variegate* Linn flowers.

Materials and Methods

Plant material

Bauhinia variegata Linn flowers were collected from the fields of Malegaon.Bk, Tal- Baramati, Dist- Pune, Maharashtra. The plant part was identified and authenticated by Prof. R. B. Deshmukh, Department of Botany, Shardabai Pawar Mahila Mahavidyalaya, Shardanagar, Baramati.

Preparation of extract

The flowers were shade dried, powdered and subjected to soxhlet extraction with ethanol. Solvent elimination was done with under reduced pressure afforded semi solid mass.

Experimental Animals

Albino mice weighing 30-40 gm of either sex were used in this study. The animals were acclimatized for one week under laboratory conditions. They were housed in standard environmental condition in polypropylene cages. They were fed with standard mice feed and water was provided *adlibitum.*

Acetic acid – induced writhing test in mice[8,9]

In acetic acid induced writhing model of Sigmond et al modified by Koster was adopted albino mice (30-40gm) which were divided into four groups of five each. Group I served as a control (received 0.75 % acetic acid solution), group II served as a standard (received Aspirin 200mg/kg), group III received the ethanolic extract of *Bauhinia variegata* Linn.(EBVF) 250 mg/kg of body weight induced intra-peritonealy and group IV received the ethanolic extract of *Bauhinia variegata* Linn.(EBVF) 500 mg/kg of body weight induced intra-peritonealy. Animals of groups II, III and IV were treated with i.p administration of 1% acetic acid solution 30 min after the administration of respective drugs. Writhing movements were observed and counted for 10 minutes after the acetic acid administration. A significant reduction in the number of writhes by drug treatment as compared to vehicle treated animals was considered as a positive analgesic response.

Tail immersion test[10,11]

Mice (30-40 gm) were divided into four groups of five animals each. Group I served as a control (received vehicle), group II served as a standard (received pentazocine PTZ 10mg/kg, p.o), group III received the ethanolic extract of *Bauhinia variegata* Linn (EBVF) 250 mg/kg of body weight induced intra-peritonealy and group IV received the ethanolic extract of *Bauhinia variegata* Linn.(EBVF) 500 mg/kg of body weight induced intra-peritonealy 30 min before the test.

The lower 5 cm portion of mouse tail was immersed in a beaker of water maintained at 55 ± 0.5 ^{0}C. The time in seconds for tail withdrawal from the water was taken as the reaction time, with a cut-off time of immersion set as 10 sec.

Statistical analysis

The results were subjected to statistical analysis by using ANOVA followed by Turkey Krammer Multiple Comparison Test.

Results

EBVF was screened for antinociceptive activity at doses 250 and 500 mg/kg, i.p. The EBVF indicated significant and dose dependent analgesic activity against both thermally and chemically induced pain. In acetic acid writhing method EBVF (250 and 500 mg/kg i.p) treated animals showed significantly reduced the number of writhing in 10 min at the rate of 32.91% and 67.835 respectively, when compared to that of control group (Table 1). In tail immersion test EBVF showed significant elevation in pain threshold in comparison to control as represented in Table 2.

Table 1 Analgesic effect of EBVF at different doses in acetic acid writhings in mice

Group	Dose (mg/kg)	No. of writhes (Per 10 min)	Inhibition %
I Control	-	79.6 ± 5.144	-
II Standard ASP (i.p)	200	29.6 ± 631***	62.81
III EBVF (i.p)	250	53.4 ± 1.435 **	32.91
IV EBVF (i.p)	500	25.6 ± 1.860***	67.83

Values are mean ± SEM (n=5) ** p<0.01, ***p<0.001 vs control (receiving only vehicle)

Table 2. Analgesic effect of EBVF at different doses in tail immersion test in mice

Group	Dose (mg/kg)	Reaction time (sec)	Protection (%)
I Control	-	2.8 ± 0.216	-
II Standard PTZ p.o	10	4.8 ± 0.291***	41.66
III EBVF (i.p)	250	3.9 ± 0.070**	28.20
IV EBVF (i.p)	500	4.72 ± 0.295***	40.67

Values are mean ± SEM (n=5) ** p<0.01, ***p<0.001 vs control

Discussion

In the present investigation, EBVF was studied for antinociceptive potential in both peripheral and central type pain models. Aspirin 200 mg/kg, i.p and pentazocine 10 mg/kg, p.o were used as standard drugs for comparing analgesic effects at peripheral and central levels, respectively. EBVF pretreatment markedly reduces the painful response produced by acetic acid, manifested as writhings at employed doses. Pain is comples process mediated by many physiological mediators e.g. prostaglandins, bradykinins, substance-p etc. in the acetic acid induced writhing model the constrictions induced by acetic acid in mice results from an acute inflammatory reaction with production of PGE_2 and $PGF_2\alpha$ in the peritoneal fluid[12,13] . Therefore, it is likely that EBVF might suppress the formation of these substances or antagonize their action for exerting antinociceptive action. The tail immersion test is commonly used to assess the narcotic analgesics or other other centrally acting analgesic drug[14] and the present result showed that EBVF also significantly elevated the response latency period or reaction time suggesting centrally mediated analgesic effect. EBVF contains steroids, flavones, saponins that may be contributing to observed pharmacological activities. We conclude the aqueous solubility of EBVF incicated that active herbal principles are polar in nature and possess antinociceptive potential. Further investigations are warranted to elucidate the exact mechanism of action.

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