

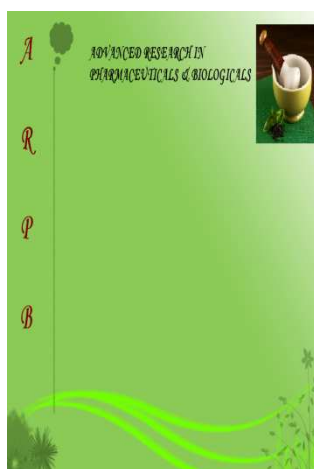


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ANTI-ULCER ACTIVITY OF AQUEOUS EXTRACT OF *BAUHINIA TOMENTOSA* LINN. LEAVES

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ABSTRACT:

In present study aqueous extract of leaves of *Bauhinia tomentosa* Linn, was evaluated for anti-ulcer activity using Alcohol-induced and Aspirin-induced ulcer model in rats used with the dose of 200,400, and 600 mg/kg body weight. Result revealed that aqueous extract of leaves of *Bauhinia tomentosa* Linn, significantly (*P< 0.001) active as anti-ulcer agent on both model in dose dependent manner. Omeprazole (20 mg/kg body weight) has been taken as standard for both model. Present study supports the traditional folklore claim and reveals that the leaves of *Bauhinia tomentosa* possess anti-ulcer activity.

KEYWORDS: *Bauhinia tomentosa*, Kachnar, Phytosterols, Flavonoids, Antiulcer.

INTRODUCTION

Research into the treatment of ulcer has been intensified after the implication of *Helicobacter pylori* in the pathogenesis of most resistant ulcer. The disease has been reported to have high recurrence and mortality rates especially in complicated cases. Herbal medicine has attracted so much interest in this area especially with herbs from the tropics¹. Herbs like the Brazilian “Pau santo”, Black pepper, the Indian “Sharpunkha” etc have been reported to possess potent antiulcer property and so many still to be investigated. The plant known as *Bauhinia tomentosa* Linn has been used traditionally for its various therapeutic properties like hepatoprotective, astringent, dysentery, diuretic, tonic, anti inflammatory, anti-neoplastic, anti-ulcer, antioxidant etc. The root bark is prescribed for liver troubles and used as a vermifuge. Infusion of the stem bark is useful as an astringent gargle. The dried leaf buds and flowers are used in dysentery^{2,4}. Hence the present work involves the study of anti-ulcer activity of *Bauhinia tomentosa* Linn. Leaves. *Bauhinia tomentosa* plant is belonging to the family Fabaceae and commonly known as Yellow tree. The plant is usually a scrambling, many-stemmed shrub or small tree reaching 4 m (max. 8) in height, the branches often drooping, with many slender twigs. Bark grey and smooth or slightly hairy on young branches, becoming brown and smooth on the older stems. Leaves deeply divided for almost half their length, with a small apical appendage between the lobes; each lobe is oval to almost elliptic, most often small about 2.5 x 2.5 cm, but may be up to 8 cm, pale fresh green; apex of each lobe broadly tapering; base of the whole leaf shallowly

lobed; margin entire, petiolate; leaf stalk 10 to 30 mm long. Fruit a woody pod, slender, pale brown, velvety, pointed, 10-11 x 1.5-2 cm, dehiscent, splitting on the tree to release 6-12 seeds^{3,4}. The present study is to evaluate the anti ulcer activity of plant leaves using Alcohol-induced and Aspirin-induced ulcer model in rats and provide supports the traditional folklore claim.

MATERIALS AND METHOD

Plant material

The plant *Bauhinia tomentosa* Linn was collected from the university garden of SASTRA, Thanjavur (T.N.). The collected specimen was authenticated by the botanist Dr. N. Ravichandran M.Sc., Ph.D., Lecturer, CARISM, SASTRA University, Thanjavur.

Preparation of extract

The leaves were dried under shade for 7 days and pulverized into coarse powders. The coarse powders (weighing 460 g) were subjected to maceration extraction. The plant powder was macerated with distilled water (with 0.01 % chloroform) for seven days with occasional shaking. The content was filtered on the seventh day and filtrate is concentrated in a rotary flask evaporator and dried in desiccator over sodium sulphite.

Animals

Wistar rats (175-225gm) of either sex and of approximate same age used in the present studies were procured from Central Animal facility, SASTRA University, Thanjavur, India. The animal were fed with standard pellet diet

(Tetragon Chemie Pvt. Ltd. Bangalore) and water *ad libitum*. All the animals were housed in polypropylene cages. The animals were kept under alternate cycle of 12 hours in darkness and light. The animals were acclimatized to the laboratory condition for a one week before starting the experiment. The experiment protocols were approved by Institutional Animal Ethics Committee after securitization. The animal received the drug treatment by oral gavage tube.

ANTIULCER ACTIVITY

Alcohol Induced Ulcer

Thirty over-nights fasted rats were divided into five groups of six rats each. All the groups of rats were given treatments as follows: group 1 received 2 ml/kg normal saline (control group), group 2 received low dose 100 mg/kg, group 3 received medium dose 200 mg/kg, group 4 received high dose 400 mg/kg body weight of *Bauhinia Tomentosa* leaves and group 5 received Omeprazole (Reference drug) 20 mg/kg body weight. After fourth day, ulcers were induced by administering 1 ml absolute ethanol (99%) to each rat. All administrations were by per oral route. After 1 hr of absolute ethanol administration, the animals were sacrificed by cervical dislocation with anesthesia. Stomachs were removed, cut along the greater curvature, and then washed with ice-cold saline, scored for macroscopic gross mucosal lesions. The area of hemorrhagic ulcer in the glandular part of stomach was measured by using transparent graph sheet and after that, the stomach were fixed in 10% normal formalin buffer solution for further histopathological study. Ulcer inhibition

(UI) was calculated using the formula below^{6,7}.

$$\text{Ulcer index} = 10/X$$

Where, X is Total mucosal area/ Total ulcerated area.

The percentage protection was calculated by the following formula:

$$\text{Percentage protection} = (\text{Ulcer index of control group} - \text{Ulcer index of treated group}) / \text{Ulcer index of control group} \times 100$$

Aspirin Induced Ulcer

Thirty over-nights fasted rats were divided into five groups of six rats each. All the groups of rats were given treatments as follows: group 1 received 2 ml/kg normal saline (control group), group 2 received low dose 100 mg/kg, group 3 received medium dose 200 mg/kg, group 4 received high dose 400 mg/kg body weight of *Bauhinia Tomentosa* leaves and group 5 received Omeprazole (Reference drug) 20 mg/kg body weight. After fourth day, ulcer was induced with aspirin (200 mg/kg) per oral in all the rats. Three hours later, the rats were sacrificed as above and their stomachs isolated and cut along the greater curvature. The excised stomachs were rinsed under tap water and viewed for ulcer craters as described above^{5,8,9}.

Statistical Analysis

The results of ulcer indices were expressed as mean \pm SEM while ulcer inhibition expressed as a percentage. Differences in mean ulcer index in comparison with control was done using the one way ANOVA followed by Tukey-Kramer multiple comparisons test with statistical significance^{9, 10} considered at $P > 0.01$ and $P > 0.001$.

RESULTS AND DISCUSSION

Effect of aqueous extract of leaves of *Bauhinia tomentosa* on alcohol-induced gastric ulceration in rats

The aqueous extract of leaves of *Bauhinia tomentosa* was evaluated for its anti-ulcer activity against alcohol-induced ulceration in rats. The results are tabulated in Table 1. Oral administration of ethanol produced severe ulceration. The aqueous extract of leaves of *Bauhinia tomentosa* significantly reduced the incidence and severity of ulceration in ethanol-induced

ulcer model. The animal treated with aqueous extract of leaves of *Bauhinia tomentosa* at the dose of 200 and 400 mg/kg per oral, produced significant decrease in ulcer index by 0.724 ± 0.191 ($p < 0.01$) and 0.53 ± 0.153 compared with disease control ($p < 0.001$) respectively. The extract at the dose of 200 and 400 mg/kg body weight afforded 37.69 and 53.37 % ulcer protection respectively, whereas Omeprazole (20 mg/kg) exhibited 69.10 % ulcer protection.

Table 1: Effect of aqueous extract of leaves of *Bauhinia tomentosa* on alcohol-induced gastric ulceration in rats

Group	Treatment	Ulcerated area Mean \pm SEM (mm ²)	Ulcer index	% Protection
I	Normal saline	106 \pm 6.5	1.162 \pm 0.517	-
II	Aqueous extract 100 mg/kg.	93.50 \pm 5.5	0.856 \pm 0.274	26.33
III	Aqueous extract 200 mg/kg	77.50 \pm 4.9	0.724 \pm 0.191**	37.69
IV	Aqueous extract 400 mg/kg	48.74 \pm 4.0	0.537 \pm 0.153***	53.37
V	Standard 20 mg/kg (Omeprazole)	33.40 \pm 3.3	0.359 \pm 0.101***	69.10

(Mean \pm SEM; N=6 in each group) ** $p < 0.01$, *** $p < 0.001$ (V_s diseased control) respectively.

Effect of aqueous extract of leaves of *Bauhinia tomentosa* on aspirin- induced gastric ulceration in rats

The effect of aqueous extract of leaves of *Bauhinia tomentosa* on aspirin-induced ulceration was studied and the results are tabulated in Table 2. The aqueous extract of leaves of *Bauhinia tomentosa* significantly reduced the ulceration produced by aspirin. The animals treated with aqueous extract of leaves of *Bauhinia tomentosa* at the dose of 400 mg/kg (High dose) body weight produced significant decreases in ulcer index by 5.01 ± 0.31 ($p < 0.001$) compared with diseased control. The extract at the dose of 400 mg/kg (High dose) body

weight afforded 49.03 % ulcer protection, whereas Omeprazole (20 mg/kg) exhibited 72.22 % ulcer protection against aspirin-induced gastric ulceration.

CONCLUSION

At the end we are concluding that, aqueous extract of *Bauhinia tomentosa* possessed significant antiulcer activity against both, alcohol induced ulcer and aspirin induced model when compared to control group. These findings indicate that aqueous extract of *Bauhinia tomentosa* display potential antiulcerogenic activity. This activity thus lends pharmacological credence to the suggested use of plant as a natural remedy in the treatment of management of ulcer.

Table 2: Effect of aqueous extract of leaves of *bauhinia tomentosa* on aspirin-induced gastric ulceration in rats

Group	Treatment	Ulcer index	% Protection
I	Normal saline	9.83 ± 1.2	-
II	Aqueous extract 100 mg/kg	8.0 ± 0.91	18.61
III	Aqueous extract 200 mg/kg	6.4 ± 0.63	34.89
IV	Aqueous extract 400 mg/kg	5.01 ± 0.31***	49.03
V	Standard 20 mg/kg (Omeprazole)	2.73 ± 0.20***	72.22

(Mean ± SEM; N=6 in each group) ***p<0.001 (V_s diseased control) respectively

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