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Antiulcerogenic study of different extracts of *Butea frondosa* Roxb in albino mice

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Abstract- Different extracts of *Butea frondosa* was assayed for Anti-ulcer activity in Experimental albino mice. Gastric ulcers were induced using 0.6M Hcl and the induced ulcers treated after half an hour, using oral doses of (250 and 500mg/kg) the extract. The extracts reduced ulcers moderately for the mice receiving 250 and 500mg/kg body wt of the extract. The dose of Chloroform extract (250mg/kg) showed a high reduction of ulceration with a corresponding healing rate of 46.08%.No apparent toxicity signs were observed through food, fluid intakes, animal behavior and stool texture. The above results indicates that different solvent (petroleum ether, chloroform, Ethanol and aqueous) extracts of *Butea frondosa* leaves posses potent chemical components for the healing of Gastric ulcers.
Key words: *Butea frondosa*, Antiulcer agent, Gastric ulcers, medicinal plants.

INTRODOCTION

Numerous plants and herbs are used to treat gastrointestinal disorders in traditional medicine. There has been renewed interest in identifying new antiulcer drugs from natural sources [1].Before Introduction of potent Antiulcerogenic agents such as H2-receptor antagonists. Proton pump inhibitors etc. Plant remedies were widely employed for the treatment of various symptoms of peptic ulcer [2]. *Butea frondosa*(Roxb.) is commonly known as flame of the forest, belongs to the family Fabaceae [3]. It is locally called as palas, muttuga, common throughout India[4].Almost all the parts of the plant are being used since decades in medicine and for other purposes [5].These days herbal medicines are more popular than modern medicine because of their effectiveness, easy availability, low cost and for comparatively devoid of side effects [6]. *Butea frondosa* Roxb is a small tree which grows to a height of 12 to 15 meters. In the summer months, when most of the trees and shrubs are dry due to the scorching heat of the sun, *Butea frondosa* synonemous to *Butea monosperma* (Lam.) truly stands out like a flame in the forest with its orange coloured flowers . The leaves of this tree are collected by the local people and a few of them are oven together with small twigs to make circular disposable biodegradable leaf plates to serve food. These plates are then used by small large groups of people during specific occasions like marriages, picnics [7]. This plant is used to treat night blindness, to check elephantiasis and as a laxative and for expelling the worms from the body, in fractures of bones, in dysentery, piles, ulcers, tumors and menstrual disorders, in cough, stromatities and early stages of leprosy can be cured[8]. Because of its wide medicinal use and availability, this study was set-out to investigate the Antiulcerogenic activity of the plants. The search for novel non-toxic,antiulcer preparations medicinal plants is currently in vogue in order to obtain alternative sources of medicine for the management of gastric hyper secretion and gastroduodunal ulcers. In the developing nations, this turn of events has been prompted in by the high cost of modern antiulcer medication as well as the multiple side effects that result from their prolonged use. In Cameroon, a nation wide OAU/STRC sponsored Ethano botanical survey revealed the presence of many plants purported by traditional practitioners to be efficient for the management of complaints symptomatic of peptic ulcer disease [1, 20].

No report has been available on the antiulcer activity of leaves of *Butea frondosa* .Hence, the present study is aimed to investigate the healing effect of the B.f. extracts on chronic experimental ulcers induced mice by treating 0.6M Hcl to mice following pyloric ligation ulcer model at four different solvent extracts like Petroleum ether, chloroform, ethanol and water extracts with two different concentration 250mg and 500mg/kg body wt.

MATERIALS AND METHODS

Animals

Healthy mice strain weighing 25-30g were procured from khaza bande nawaz medical college Gulbarga.They were fed with standard pellet diet as described by CFTRI Mysore India, and maintained temperature of 24-28°c with relative humidity of 60-70% and water given ad libitum. Unlike for the prophylactic tests, the animals were deprived of food only for 24h prior to the induction of HCl ulcers, but free access to water was allowed. Prior use of laboratory animals in this study, the authorization was obtained from animal ethical committee.

Preparation of plant extract

The leaves of Butea frondosa,were harvested in the month of August 2008 from the fields near to the Gulbarga university campus Gulbarga,Karnataka, authenticated at the department of Botany,Gulbarga university Gulbarga.The leaves of the specimen are washed with tap water, shade dried at room temperature in the animal and pharmaceutical biotechnology Laboratory. It is essential that the drying operation is carried out under controlled condition to avoid chemical changes of the plant component. Plant taken to be free from fungal or bacterial infections. The dried leaves of the plant were crushed to a powder form and 40g of the powder was subjected to soxhlet extraction for isolation of crude drug using petroleum ether,chloroform,ethanol and distilled water extracts as the solvents at their required temperatures. It takes 7-8 hrs for complete extraction. After extraction different solvents give different coloured extracts, these extracts were kept for evaporation at 40 to 50°C for two days. Different solvents yield different gummy extracts and resulting greenish, brownish or whatever coloured compound obtained was used for ulcer healing tests.

Ulcer healing tests

Different extracts of *Butea frondosa* was suspended in 1% Tween 80.It is diluted in water to obtain different concentrations and administered through intragastric catheter tube by the method described by Deshapande et al., 2003 . Laprotomy was performed under light ether anesthesia on experimental mice that were deprived of food during the proceeding 24hrs.

In this assay the mice were divided into 10groups of six mice each. All the mice were treated with 0.6M Hcl 1ml each. After half an hour of treating with Hcl,Animals were treated with different extracts and left for 4hrs then pyloric ligation was made, and kept for 1hr.After 1hr animals were sacrificed with excess of anesthetic ether and stomach was dissected out.

As the animals were made into 10 groups, Group one is considered as positive control and group two is considered as negative control. Negative control was treated with Tween 80 and positive control is treated with standard drug rantidine.Group three, four ,five and six were treated with lower dose 250mg of petroleum ether ,Chloroform, ethanol and water extracts respectively and group seven, eight ,nine and ten were treated with 500mg of petroleum ether,Chloroform,Ethanol and water extract respectively. The degree of auto healing was evaluated by comparing the untreated control ulcers with those of the extract treated mice [20]. An ulcer index was evaluated and the healing rates of the ulcers were calculated by comparing the ulcer status of extract and Ranitidine treated mice and also with negative control.

Toxicity study

Food and water intakes as well as body weights were measured daily. Aggressiveness sensitivity to touch and to noise, mobility alertness and stool texture were also evaluated daily.

Statistical analysis

Values in tables are given as arithmetic means ± standard error of the mean (S.E.M.) The significance of differences between means was calculated using the students t-test

RESULTS AND DISCUSSION

The effect of all the extracts of *Butea frondosa* on the healing rate of chronic gastric ulcers induced by 0.6M Hcl on mice is shown in Table 1.The results depicted in table 1 shows a decrease in ulcer score, volume of acid secretion and total acidity in various extracts of two different concentrations(250mg and 500mg/kg/bodyweight) and four extracts of *Butea frondosa*

i.e Petroleum ether,Chloroform,Ethanol and Water extracts.Rantidine is used as standard drug and 1% Tween 80 was used to treat negative control group. Mice were fasted for 24hrs and then were treated with 250mg &500mg/kgbody wt of different extracts of *Butea frondosa*. When mice were treated with petroleum ether at the dose level of 250mg/kg, body weight has shown total acidity 50m Eq/ml and ulcer score was 14.83 and curative ratio was 22.59, and the mice treated with a dose of 500mg/kg body weight has shown the curative ratio was 20.14%.When mice were treated with chloroform extract of 250mg ,the curative ratio was 46,08% and that with 500mg was 37.36%.Ethanolic extract with 250mg showed the curative ratio 28.36% and that with 500mg showed 39.97%.Water extract showed at 250mg 35.64% and at 500mg it was 40.86%.Then standard drug used to compare with the extracts was Rantidine (50mg/kg body wt)its curative ratio was 41.75%

Toxicity evaluation

Behaviour and stool texture

The acute toxicity of all the extracts was assessed in mice as described by Souza19.A single high dose of 1000mg/kg body wt.b.f)was administred to a group of animals after a 12h fast. Reduced mobility was observed for all the treatment groups.This was associated with increased aggressiveness during same period compared with non ulcerated controls.This was followed by significant return to normal with improved healing.However the return to normal mobility was slower in the negative control.sensitivity to touch was also highlightned during the experiment but was similar for all the treatment groups and treatment with extract did not show any signs of drowsiness and stool texture was not affected in any of the treatment groups compared with the normal texture observed in controls. Many plants conveniently available in India are used in traditional folklore medicine have been accepted as main source of drug discovery [18, 19].The present data on antiulcerogenic studies of *Butea frondosa* on pyloric ligated ulcer induced mice has demonstrated the efficacy of different solvent extracts of *Butea frondosa* against gastric ulceration.when treated with petroleum ether with concentration of 250mg/kg body weight of mice,the mice showed a total acidity of 50mEq/ml and the ulcer score was 14.83 and curative ratio is 22.59% same extract with concentration 500mg body weight showed a total acidity of 60mEq/ml and the ulcer score was 15.3 and curative ratio was 20.14%.when mice treated with chloroform extract of concentration 250mg,the total acidity 15mEq/ml and the ulcer score was 10.33 and curative ratio was 46.08%.same extract with 500mg/kg body wt of mice showed total acdity of 20mEq/ml and the ulcer score was 12 and curative ratio was 37.36%.Ethanol extract with concentration of 250mg showed the total acidity of 20mEq/ml and the ulcer score was 13.6 and curative ratio was 28.36%.same extract with concentration of 500mg showed total acidity 22.5mEq/mland the ulcer score was 11.5 and the curative ratio was shown to be 39.97%.water extract with concentration of 250mg showed a total acidity ofmEq/ml and the ulcer score was 12.33 and curative ratio was 35.64%.same extract with concentration of 500mg showed total acidity of mEq/ml and ulcer score was 11.33 and curative ratio was 40.86%.Rantidine used as a positive control to compare this antiulcerogenic study.It is treated with 50mg/kg body wt,the mice showed a total acidity of 27.5mEq/ml and ulcer score was 11.16 and curative ratio was 41.75%. Alkofahi(1999) showed that all of the effective plant extracts contained tannins or flavanoids [9].Ramirez(2003) showed that tannins extracted from S.cumini have significant gastroprotective property [10].Although the extract nature of phytoconstituents present in this plant is not clear,it is a rich source of tannins and ascorbic acid [11,13]. Maira and others showed that Phytochemical analysis revealed the presence of Flavanoids in the MeOH extract [12]. These compounds which are important for the normal growth,development and defense of plants [14], also exerts a gastroprotective action in mammals by increasing endogenous prostaglandin levels, decreasing histamine secreation,inhibiting Helicobacter pylori and scavenging oxygen derived free radicals [15] .This gastroprotection has been reported for various flavanoids including naringinquercetin,kaempferol,sophoradin and lutiolin [16,17]. So the present study has revealed potent antiulcerogenic activity of Butea frondosa.

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Table 1- *Showing effect of Butea frondosa on pyloric ligated ulcer induced mice*

Group No	Treatment	Dosage Mg/kg Body wt	Total acidity mEq/ml	Ulcer score	% of inhibition
I	Negative control1%tween	1ml	85.34±0.052	19.16±0.408	
II	Petroleum ether extract	250	50.5±0.063	14.83±0.752	22.59%
III		500	60.3±0.051	15.3± 0.516	20.14%
IV	Chloroform	250	15.08±0.098	10.33±0.516	46.08%
V		500	20.23±0.081	12.00±0.408	37.36%
VI	Ethanol	250	20.25±0.054	13.6±0.516	28.36%
VII		500	22.53±0.051	11.5±0.547	39.97%
VIII	Water	250	25.6±0.063	12.33±0.547	35.64%
IX		500	29.98±0.075	11.33±0.516	40.86%
X	Posetive Contol/std Rantidine	50	27.53±0.051	11.160±0.752	41.75%

The results are expressed as mean±SE 0f 6 animals in each group
p values<0.05 B.f-Butea frondosa