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Research Article

Hepatoprotective activity of *Capparis decidua* on liver damage caused by thioacetamide in Wistar male Rats

Mahesh K. Jhajharia, Sunil K Agarwal, B. Srivastava

ABSTRACT
The ethanol extract of *Capparis decidua* has been evaluated for possible hepatoprotective activity using several experimental animal models. The ethanol extract showed significant hepatoprotective activity at the dose levels examined.The ethanol extract at dose of 600 mg/kg showed significant decrease the hepatic enzymes e.a. SGPT, SGOT, Bilirubin and ALP as compaired to standard drug silymarin 100 mg/kg.

INTRODUCTION

Capparis decidua

A densely branched, spinous shrub or tree, up to 6 m in height (rarely 10 m), with a clear bole of 2.4 m; branches terete, smooth green. Leaves simple, caducous found only on the young shoots (the older branches leafless), linear-oblong, acute, spinous pointed, stipular thorns long, sharp, straight, orange yellow. Flowers red, in many-flowered corymbs on the old branches, or short lateral shoots; pedicels slender, about 12 mm long. Sepals: The outer pubescent, ciliate, subvalvate, the lower sepal very saccate, acuminate, the upper much smaller, ovate-oblong, concave; inner sepals elliptic, acute, with floccose margins.

Chemical constituent

A new spermidine alkaloids, capparidisine (1) and capparisine (2) have been isolated from the root bark of *C. decidua* and their structure established by spectral means [Ahamd *et al.*, 1985; Ahamd *et al.*, 1986].

Ahmad *et al.* (1992) reported two new spermidine alkaloids, 14-N- acetylisocodonocarpine (5) and 15-N-acetylcapparisine (6) from the root bark of *C. decidua*.

A new spermidine alkaloid, isocodonocarpine (4) was isolated from the root bark of *C. decidua* and its structure elucidated by spectral studies including 2D NMR [Ahamad *et al.*, 1989].

Traditional Use

The bark is acrid, analgesic, diaphoretic, alexeteric, anthelmintic and useful in cough, ulcers and boils, vomiting, piles, asthma and inflammations [Agarwal, 1997; Mhaskar *et al.*, 2000]. The plant is used as carminative, tonic, emmenagogue, aphrodisiac, and alexipharmac; improve the appetite; good for rheumatism, lumbago, hiccough, cough and asthma [Mhaskar *et al.*, 2000].

The root bark is pungent, bitter, given in intermittent fevers and rheumatism [Nadkarni and Nadkarni, 1976; Purohit and Vyas, 2005].

MATERIALS AND METHODS

Plant material

Root bark of *Capparis decidua* was collected in the month of October 2009 from the forest of Ramgarh, in

Table 1: Effects of ethanolic extract of roots of *Capparis decidua* on certain serum biochemical parameters in Thioacetamide induced hepatotoxicity in rats

Groups	Biochemical Parameters			
	SGPT(IU/L)	SGOT(IU/L)	Bilirubin *(mg/dl)*	ALP(IU/L)
Normal group (5 ml/kg, po)	17.11± 0.57	30.81 ± 0.62	0.77± 0.35	108.66 ± 1.11
TA control (400 mg/kg, SC)	35.50±1.17**	70.40±0.61**	1.04±0.01**	229.67± 0.75**
C. decidua + TA (300 mg/kg, po)	27.33±0.49 (44.42%)	48.08±1.24 (56.37%)	0.82± 0.01 (81.48%)	141.66 ± 1.94 (72.72%)
C. decidua + TA (600mg/kg, po)	21.01± 0.49** (78.79%)	32.01± 1.15** (96.96%)	0.81±0.01** (85.18%)	114.15± 4.18** (95.46%)
Silymarin+ TA (100mg/kg,po)	18.22± 1.08** (93.96%)	31.21± 1.03** (99.01%)	0.78±0.02** (96.29%)	110.01± 0.42** (98.88%)

Values are Mean ± SEM, (n =6 in each group). Figures in parenthesis are percent protection as compared to thioacetamide control. Thioacetamide control group was compared with normal group and all values were significantly different (P< 0.01). Experimental groups were compared with thioacetamide control: *p<0.05 and **P< 0.01.

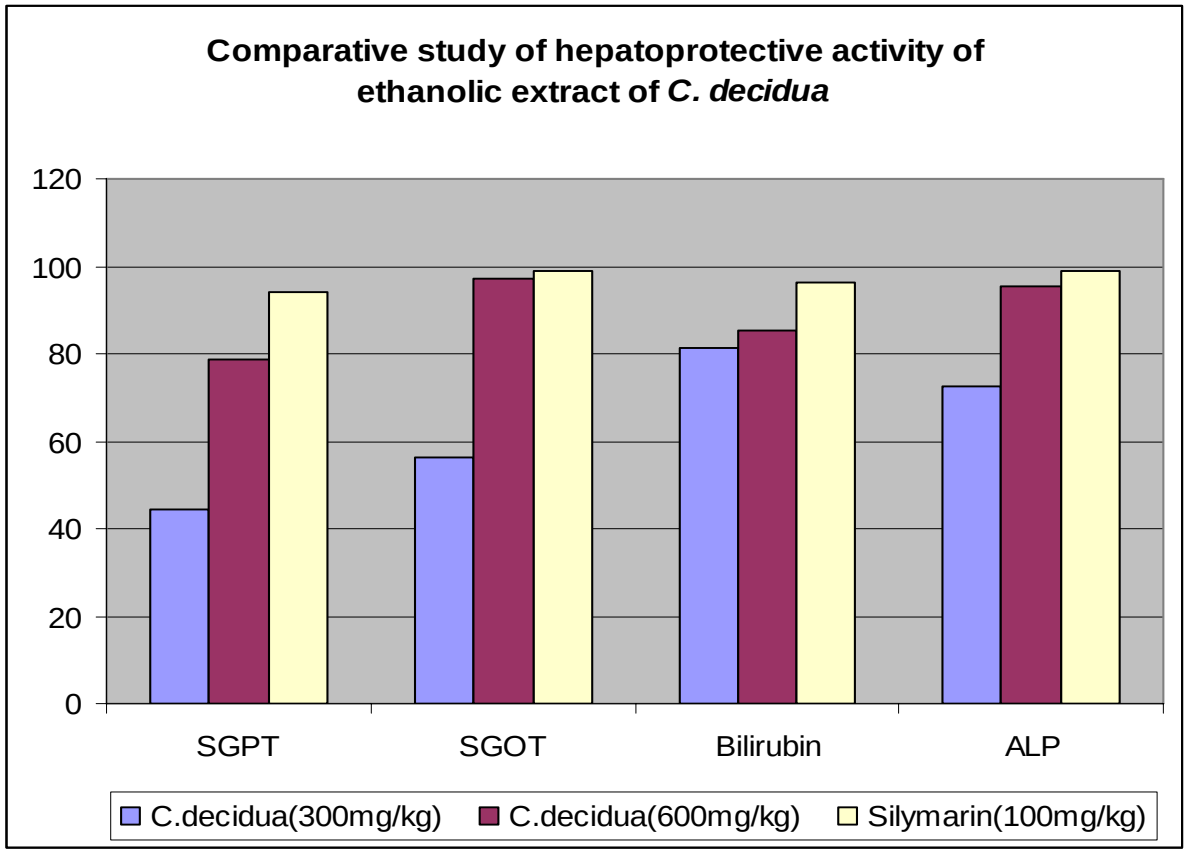

Fig 1: Effect of ethanolic extract of *C. decidua* and sylmarin on biochemical estimation of SGPT, SGOT, Bilirubin and ALP of thioacetamide induced toxicity in male Wistar rats.

Jaipur District, Rajasthan (India). The plant material was identified and authenticated by Mr. Vinod Kumar, Department of Botany, Rajasthan University, Jaipur, Rajasthan. (Herbarium No.RUBL/20858)

Preparation of extract

The root bark of Capparis decidua were washed thoroughly in tap water, shade dried and powdered. This powder was packed into Soxhlet column and extracted with water (70 - 80^{0}C) and with ethanol (68 - 78^{0}C) for 24 h. The extracts were concentrated on water bath (50^{0}C). After concentrated preparation, the dried powder extract was stored at 4^{0}C. The yield of the aquous extract and ethanolic extract were found to be 11.62% (w/w) and 5.13% (w/w) respectively. Ethanolic extract were used for the experimental study.

Animals

Wister male Albino rats (150 - 200 g) were used for the study. The animals were kept in polypropylene cages and maintained at a temperature of 26 ± 2^{0}C. They were fed with standard diet supplied by Pranav agro industries Ltd. Sangli. All the animal experiments are conducted in accordance with the guidelines of the CPCSEA (Reg No. 1083/ac/07/CPCSEA), guide for care and use of laboratory animals. After procuring the animals were acclimatized for 10 days under standard husbandry conditions as: Relative humidity 45 - 55%, and 12 h light and dark cycle.

Acute toxicity study

The male Wistar rats of 150 - 200g body weight were selected to find out the acute toxicity study of ethanolic extract of *Capparis decidua* roots. The dose of 5, 50, 300 and 2000 mg/kg were selected based on the fixed dose (OCED Guideline No. 420) method of CPCSEA. The animals were continuously observed for 24 h to detect changes in autonomic or behavioral responses. Mortality in each group was observed for 7 days.

In the acute toxicity study ethanolic extract of roots of *Capparis decidua* were found to be toxic (2/3 rats died) at a dose of 1800 mg/kg, intraperitoneally. Hence, LD cut off value of ethanolic extract was fixed as 1800 mg/kg body weight. So, that 1/5th and 1/3rd of the LD_{50} cut off value that is 600mg/kg and 300 mg/kg body weight were selected as screening dose for hepatoprotective activity.

Assessment of hepatoprotective activity

The animals were divided into five groups of six Wistar male albino rats each. The animals were fasted for 24 h prior to Thioacetamide treatment. Group I was maintained as normal control received normal saline 5 ml/kg po. All the animals of group II to V

received thioacetamide 400mg/kg, Group II animals were maintained as thioacetamide control without any drug treatment. Group III and IV were treated with 300 and 600 mg/kg ethanolic extract respectively. Group V animals were treated with Silymarin (100 mg/kg, po) which served as standard group. The vehicle or drug treatment was carried out po from 1st day to 5th day with concurrent administration of thioacetamide on 2nd and 3rd day. During the period of drug treatment the rats were maintained under normal diet and water *ad libitum.*

The animals of all the groups were sacrificed by light ether anesthesia on 6th day. The blood sample of each animal was collected separately by carotid artery into sterilized dry centrifuge tubes and allowed to coagulate for 30 mm. Serum was separated by centrifugation 3000 rpm for 15 mm. The serum was used to estimate serum glutamate pyruvate transaminase (SGPT), serum glutamate oxaloactetate transaminase (SGOT) (Henry et al., 1974), total bilirubin (Gambino, 1965) and serum alkaline phosphatase (ALP) (Walter and Schutt, 1974). Livers were removed and preserved in 10% formalin solution for histopathological studies.

Statistical analysis

The mean ± S.E.M. was calculated for each parameter. Total variations, present in a set of data were estimated by one way analysis of variance (ANOVA), followed by Dunnet's 't' test. $P < 0.05$ was considered as statistically significant when compared to control group. The percentage of the protection is calculated as 100 X (Values of Thioacetamide control — Values of test sample) / (Values of thioacetamide control — Values of normal control).

RESULTS AND DISCUSSION

Effect of ethanolic extract of *Capparis decidua* on thioacetamide induced liver damage in rats with reference to biochemical changes in serum are shown in Table 1. At the end of the 5th day treatment, blood sample of thioacetamide treated control animals showed significant increase in the level of SGPT, SGOT and ALP compare to normal control. Pretreatment with *Capparis decidua* extract at 300 and 600 mg/kg showed marked decreased of SGPT, SGOT and ALP as compared to the thiocetamide treated group. The maximum protection was shown by ethanolic extract at the dose of 600 mg/kg body weight (Table 1).

Total Bilirubin levels are shown in Table 1. The rats exposed to thiacetamide showed significant increased levels of bilirubin as compare to control. Pretreatment with *Capparis decidua* extract showed significant ($P < 0.01$) decreased level of total and direct bilirubin to the near normal which is comparable to the values registered in the standard drug treated (Silymarin) group of animals, indicating the protection of hepatic cells.

Decrease of biochemicals i.e. SGPT, SGOT, bilirubin and ALP by *Capparis decidua* The percentage ethanolic extract (300mg and 600mg/kg) and silymarin (100mg/kg) in thioacetamide induced hepatotoxicity in male Wistar rats is shown in Table1.

The etanolic extract of *Capparis decidua* (600 mg/kg) significantly decrease thioacetamide induced enzymes SGPT (78.79%),SGOT (96.96%), Bilirubin (85.18%) and ALP(95.46%) as compared to standard drug silymarin (100 mg/kg 0 SGPT (93.96%), SGOT (99.01%), Bilirubin (96.29%) and ALP(98.88%) .

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