

Hepatoprotective activity of *Cassia fistula* alcoholic extract against CCl₄, induced liver damage in albino rats

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ABSTRACT

In this present study *Cassia fistula* (caesalpinaceae) fruits were extracted in 90% alcohol and water. The extract was vacuum evaporate to driness which yield 26.02%. The extract was evaluated for hepato protective activity against CCl₄ induced liver damage 50m/g 100mg/kg body weight. The biochemical parameter observed in the serum were Asparate transminase (AST), Alanine transaminase (AST), Alkaline phosphatase (AST), total protein and total lipid, Histopathologicla studies on the liver tissue were also performed. The extract exhibited dose dependent reduction in (AST), ALT and ALP and increase in total protein levels. Extracts thus *Cassia fistula* extract attenuates the hepatotoxic effect of CCl₄.

Key words: *Cassia fistula*, CCl₄, Albino rats.

INTRODUCTION

Liver regulates various important metabolic functions, hepatic damage is associated with distortion of these metabolic functions (Wolf 1999), liver disease are still a world wide health problem. Unfortunately conventional or synthetic drugs used in the treatment of liver disease are inadequate and some times can have serious side effects. This is one of the reason for many people in the world over including those in developed countries turning complimentary and alternative medicine (CAM).

Cassia fistula (Casealpinaceae) tree is one of the most widespread in the forest of India, usually in deciduous forest. The whole plant possesses medicinal properties useful in the treatment of skin disease, inflammatory diseases, rheumatism, anorexia and jaundice (Anonymous, 1992, Kirtikar and Baue 1991). A new bioactive flavon glycoside is reported by (Yadav and Verma, 2003).

However a detailed pharmacological screening of the *Cassia fistula* pod extracts have not been reported. The present study reports the hepato protective activity of *Cassia fistula* pod extracts.

MATERIALS

Plant Material

The pods of *Cassia fistula* Linn (Caesalpinaceae) were collected from Vidisha, MP, India during the month of Sept. and identified by Dr. S.K. jain dept of botany. The pods were dried in shade for a week. Then powdered and extracted with 90% alcohol and water by sox let extraction (24 hrs) to yield the extract. The extracts were vacuum dried in a rotary vacuum evaporator and the extractive yield was 26.02%.

Inbred Wistar albino male rats (100-120gm) were used for the evaluation of pharmacological activities. They were kept in colony

Table 1: Protective effect of Cassia fistula fruits extracts on carbon tetrachloride induced different biochemical parameters in the serum of rats

Parameter	Group-I control with LP only	Group-II LP+ control	Group-III LP+CCl ₄ +CF50mg/kg b.w.	Group-IV LP+CCl ₄ +CF 100mg/kg b.w.	Group-V LP+CCl ₄ +CF 200mg/kg b.w. control	Silymerin 100mg/kg b.w.
Aspartate	22.42±0.68	35.72±1.48	32.92±1.30	25.68±1.20	23.79±1.20*	23.64±1.28
Transaminase%						
Alanine	25.12±1.54	63.20±2.98	56.20±2.68	40.28±2.14	29.98±2.16*	26.98±2.16
Transaminase%						
Alkalline	69.84±3.82	122.32±3.42	120.40±3.40	85.30±3.40	78.40±3.52*	75.06±3.14
Phosphatase%						
Total protein (g/100mLserum)	6.82±0.46	4.28±0.18	4.42±0.26	5.42±0.44	5.96±0.43*	6.14±0.40
Total lipid (mg/100gcerum)	178.46±5.62	257.78±8.92	234.82±7.42	182.24±6.12	146.42±5.14*	138.24±5.22
Tryglycerides(mg/100g cerum)	8.18±0.62	14.12±1.62	14.02±1.38	12.96±1.16	9.24±0.55*	9.02±0.52
Colesterol (mg/100gcerum)	62.38±3.21	101.02±5.24	93.14±5.12	81.62±4.14	78.69±4.08*	63.21±4.12
Phospholipid (mg/100g cerum)	119.30±6.84	250.32±12.08	214.22±10.08	156.28±8.02	140.28±8.32**	146.30±8.64

* P<0.5 as compared to group - I

** P< 0.10 as compared to group - II

Value are mean ± SE from 6 animals of each group

cages at 25± 2°C, relative humidity 45-55% under 12hrs light and dark cycles. All the animals were kept acclimatized for a week before use. They were fed with standard animal feed (Hindustan lever ltd) and water adlibitum. The test compound and the standard drugs were administered in the form of a suspension using 5% gum acacia as vehicle, to each group consisted of six animals.

All the pharmacological experimental protocols were performed according to the recommendation of the CPCSEA and institutional animals ethical committee.

Experimental bioassay methodologies

Rats were divided into six groups of six animals in each groups Group I (control) animals were administered a single daily dose of liquid paraffin (1ml/kg body weight, p.o) test group (group III – IV) were administered orally 50, 100 and 200 mg/kg body weight the plant compounds respectively compound aqueous suspension daily once a day. Group VI received Silmeryn, the known hepato protective compound (Sigma chemical company, USA), at a dose of 100mg/kg, p.o. along with CCl₄. Treatment duration was 14 days, dosage of CCl₄ was administered as 30% solution in liquid paraffin for every 72 hrs. Animals were sacrificed 48 hrs after the last injection. Blood was collected, allowed to clot and serum was separated. Liver was dissected out used for biochemical studies.

Hepatoprotective activity method

In the pretreatments studies, animals were divided into six groups with 6 animals in each groups. Group I was served as normal control. Group II was CCl₄.control and group III, IV and were treated with plant extracts at three different doses 50, 100 and 200 mg/kg and group (VI) received an standard drug silymerin at a dose of 50ml/kg body weight, respectively.

Biochemical assay

Aspartate amino transferase (AST), Alanine amino transferase (ALT) were determined. Liver tissue were homogenized on ice in 0.15M KCl. The homogenates were centrifuged at 300 rpm for 15 min at 4°C and the supernatants were taken for lipid per oxidation assay.

Table 2: Protective effect of cassia fistula on different biochemical parameters in the liver of rats

Parameter	Group-I control with LP only	Group-II LP+ control	Group-III LP+CCl ₄ +CF50mg/kg b.w.	Group-IV LP+CCl ₄ +CF 100mg/kg b.w.	Group-V LP+CCl ₄ +CF 200mg/kg b.w. control	Silymerin 100mg/kg b.w.
Total protein (g/100mL serum)	8.22±0.32	5.32±0.23	5.25±0.32	7.12±0.28	7.82±0.28*	8.14±0.28
Total lipid (mg/100gcerum)	5920±602	8124±156	7942±155	7812±152	6722±142	6528±146
Trylycerides	603.2±82.2	872.4±48.2	872.4±40.2	814.2±40.2	752.2±39.6	762±58.4
Colesterol (mg/100gcerum)	598.9±26.1	856.1±34.1	810.2±28.1	624.6±23.5	621.6±21.5**	684.2±28.4
Phospholipid (mg/100g cerum)	2380±121.8	1687±46.4	1778±78.4	2162±92.2	2276±98.2	2312±112.4

* P<0.5 as compared to group - I

** P< 0.10 as compared to group - II

Value are mean ± SE from 6 animals of each group

RESULTS AND DISCUSSION

The present study report the effect of *Cassia fistula* fruits extracts on CCl₄.induced hepatic damage in albino rats. Three different doses of the extract was tried on CCl₄.induced rats to observe AST, ALP and AIT parameter, from the result, it appears that maximum activity of dose III was quit comparable to the silymerin standard drug, which shows 24.64±1.28 of the total serum.

Histo pathological findings as shown in figure (1) revealed the reduction of inflammation in normal central vein and hepato cytes to the normal stage from the results of table (2), it appeared that protein was found to be significantly less in group II and III as compared to the control group I regarding triglycerides in liver tissue, it was increased in CCl₄.treated rats. Which got decreased to the normal level. Results as 200mg dosage were found to be quite effective which was similar to the silymerin. (P<0.05)

Roy *et al.*, (2006) have reported that decoction of fruit of *Cassia fistula* to cure jaundice within three days. The results present in table 1 and 2 revealed the decrease in serum transaminase which may be due to stabilization of plasma membrane and hepato protection caused by plant extracts. In the present study it was noticed that 200mg/kg body weight dose of *Cassia fistula* gave total lipid value similar to the normal rat. The result are quite similar to the normal rat The results are quite similar as reported earlier by pradeep *et al.*, (2005) who have noticed the recovery of hepatocytes damage caused by CCl₄. treatment after the *Cassia fistula* extracts.

Therefore the present finding suggests a hepatoprotective effect of *Cassia fistula* ethanolic extract against CCl₄.hepatocyte damage caused to the liver cells.

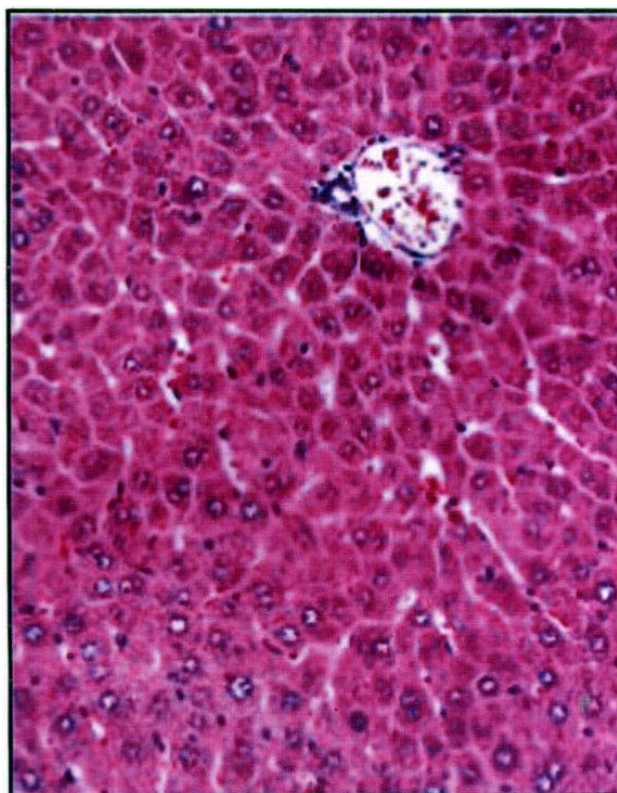


Fig. 1: Shows normal hepatocytes and control vein after treatment with 200mg kg wt. (H.E. × 450)

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