

Hepatoprotective Activity of *Melia azedarach.L* Against Carbontetrachloride-Induced Hepatic Damage In Rats

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Abstract

The leaves of *Melia azedarach.L*, family Meliaceae was tested for hepatoprotective activity against CCl₄ in rats. The ethanol extract of *Melia azedarach.L* has shown significant activity, lowering the serum enzymes like SGOT and SGPT in rats intoxicated with CCl₄.

Keywords: *Melia azedarach.L*, hepatoprotective, carbon tetrachloride

Introduction

Melia azedarach.L, family Meliaceae is from west Asia. It is widely distributed in Himalayan region between the attitude of 700 to 1000m. A moderate-sized deciduous tree 9-12m in height with a cylindrical bole with dark grey bark having shallow longitudinal furrows; The leaves are bi- or tripinnate, pinnate opposite or alternate, ovate or lanceolate, serrate, acuminate, glabrous on both surface, slightly oblique at the base.¹ It has been used for various medicinal purposes.² The leaf juice is used as an anthelmintic. It is also used to cure strangury, amenorrhoea, bronchitis, leprosy, eczema, asthma and as an antipyretic.³ Phytochemical studies reveal the presence of alkaloids, flavanoids, steroids, tannins and lycopena etc.,⁴ The present study was made to evaluate the effect of ethanol extract of *Melia azedarach.L* against CCl₄-induced hepatic damage in rats.

Melia azedarach.L against CCl₄-induced hepatic damage in rats.

Materials and methods

The leaves of *Melia azedarach. L* were collected from the Western Ghats of Anamalai Hills, Coimbatore district, Tamilnadu. The plant was identified and authenticated by Botanical Survey of India (IBSI), Coimbatore, Tamilnadu, India. The leaves of the plant were collected and dried. The dried and powdered aerial parts of the plant (250gm) were extracted with ethyl acetate using soxhlet apparatus and concentrated *in-vacuo*. Approximately, 0.50g of dried ethanol extract was obtained from 30g of dried stem material. The extract was suspended in 50% gum acacia and used for studying hepatoprotective activity.

Male albino rats weighing between 160 and 200 g were used as animal models. The rats were divided into four groups, each group consisting of six animals. Hepatoprotective activity of *Melia azedarach.L*, was evaluated using CCl₄-induced model.⁵ Group one was kept on normal diet and served as control, the second group received CCl₄ (1.25 ml/kg) by oral route, the third and fourth group received silymarin (100 mg/kg; po) and extract of *Melia azedarach. L* (300 mg/kg; po) respectively once daily, for seven days. On the seventh day, CCl₄ was given by oral route 30 min after the administration of silymarin and test drug. After 36h of CCl₄ administration, blood was collected and serum separated was analyzed for various biochemical parameters.

Biochemical parameters like serum glutamic oxaloacetic transaminase (SGOT) and serum glutamic pyruvate transaminase (SGPT) were determined by Reitman and Frankel method.⁶ Serum alkaline phosphatase was determined by King and Kings method.⁷ Malby and Evelyn method⁸ was followed to estimate total bilirubin content.

The liver was examined grossly, weighed and stored in formalin 10% and were processed in embedded paraffin using the standard microtechnique.⁹ A section of the liver (5µm) stained with alummhemotoxylin and eosin was observed microscopically for histological studies.

Results and discussion

The results of biochemical parameters has shown the elevation of enzyme level in CCl₄-treated group, indicating that CCl₄ induces damage to the liver (Table 1). Liver tissue rich in both transaminase increased in patients with acule hepatic diseases, SGPT which is slightly elevated by cardiac necrosis is a more specific indicator of liver disease.¹⁰ A significant reduction ($P < 0.01$) was observed in SGPT, SGOT, ALP and total bilirubin levels in the groups treated with silymarin and ethanol extract of *Melia azedarach. L*. The enzyme levels were almost restored to the normal.

It is observed that the size of the liver was enlarged in CCl₄-intoxicated rats but it was found to be normal in drug- treated groups. A significant reduction ($P < 0.001$) in liver weight supports this finding.

It was found that the extract decreased the CCl₄-induced elevated levels of the enzymes in group third and fourth, indicating the production of structural integrity of hepatocytic cell membrane or regeneration of damaged liver cells by the extract.

Histopathological examination of the liver section of the rats treated with toxicant showed intense centrilobular necrosis and vaculization. The rats treated with silymarin and extracts along with toxicants showed sign to considerable extent as evident from formation of normal hepatic cards and absence of necrosis and vacuoles.

Decrease in serum bilirubin after treatment with the extract in liver damage indicated the effectiveness of the extant in liver damage indicated the effectiveness of the extract in normal functional status of the liver. The phytochemical studies revealed the presence of flavonoids in ethanol extract of *Melia azedarach. L* various flavonoids have been reported for their hepatoprotective activity.¹¹ The hepatoprotective effect of *Melia azedarach. L* may be due to its flavonoid content.

Table 1. Effect of ethyl acetate extract of *Melia azedarach. L* on CCl₄ treated rats Design of treatment Liver (wt/100g)

Design of treatment	Liver(wt/100g body wt)	Dose(mg/kg)	SGPT U/L	SGOT U/L	ALP U/L	Total Bil
Control	3.9±0.02	-----	131.7±2.03	44.8±0.77	166.4±3.11	0.79±0.02
CCL4	6.2±0.29	1.25ml/kg	222.6±4.6	347.3±2.6	387.9±16.13	2.16±0.01
Silymarin+CC14	3.7±0.21	100	132.2±1.12	83.7±9.14	212.8±5.21	0.8±0.07
Ethanol extract+CC14	4.6±0.17	300	117.4±1.09	68.5±5.21	287.9±4.96	0.84±0.01

$N = 6$ animals in each group.

* $P < 0.001$; ** $P < 0.01$ when compared with control. Values are expressed as mean + SE.

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