A preliminary study on the hepatoprotective activity of *Musa paradisica* roots in albino rats.

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Abstract:

Objective: To evaluate the hepatoprotective activity of *Musa paradisica* root extract on hepatotoxicity induced by Carbontetrachloride

Methods: The hepatoprotective activity of *Musa paradisica* root extract was assessed on Carbontetrachloride induced hepatotoxicity at dose of 300mg/kg body weight and Liv 52 was taken as standard.

Results: Serum GPT, GOT and ALP levels were significantly elevated after Carbontetra chloride intoxication in rats compared with control animals. These parameters were reversed to normal after administration of the extracts.

Conclusion: *Musa paradisica* root extract proved to possess hepatoprotective activity

Introduction

Liver plays a major role in the detoxification and excretion of endogenous and exogenous compounds, any injury to it or impairment of its function may lead to many complications of ones health. Living in the world of inadequately controlled environmental pollution and indiscriminate use of systemic drugs like tetracycline, paracetamol, anti-tubercular drugs, oral contraceptives of hormonal origin, chemicals as food preservatives and agrochemicals are threatening the integrity of the liver. Further addiction to alcohol and other drugs have aggravated the problem.

In traditional systems of medicine a number of herbs have been advocated for treating liver disorders. Modern medicines have little to offer for alleviation of hepatic ailments whereas most important representatives are of Phytoconstituents.[1 & 2]

Musa paradisiaca is a perennial herb widely distributed in moist tropics. A stoloniferous plant with cylindric trunk, large, oblong green leaves and cylindric yellowish or yellowish green pulpy fruits. Due to its enriched food value and versatile medicinal value, banana is one of the most important fruits and vegetable crops of India. The roots are used as tonic for congestion of the liver and to prevent or cure scurvy, prescribed for glandular disease, veneral disease, anemia and disorders of the blood, to cure yoni dosha (ailments of female genital tract). Flowers checks excessive bleeding during menstruation, Fruits to promote flow of urine, relieve sore throat and congestion of the chest, gentle laxative, indigestion, diarrhea and anemia. Stem is used in nervine disorders, to cure asthma, ulcer, diarrhea, dysentery and jaundice. [2-6]

The review of literature revealed no work on the hepatoprotective aspects of this plant. In this paper we report the activity of the ethanolic extract of *Musa paradisiaca* roots in Carbontetrachloride induced toxicity models.

Materials and Methods

Plant material: *Musa paradisiaca* roots were collected from local areas of Dharwad and Hubli and authenticated by Dr. G.R. Hegde, Professor and Head, Department of Botany, Karnatak University, Dharwad. A voucher specimen has been deposited at KLE'S COP Hubli, Karnataka.

Preparation of Root extract:

The roots were shade-dried, powdered and Soxhlet extracted with 95% ethanol. The total ethanolic extract was then evaporated to dryness in vacuo and kept at 4^0C until use (yield 5.95%w/w). Preliminary phytochemical investigations revealed the presence of phytosterols, triterpenoids, flavonoids, tannins and carbohydrates. Extract was formulated into an emulsion using Tween 80[1%].

Animal selection: Healthy adult Swiss albino mice (25 and 30) g was used for the acute toxicity studies. Laboratory inbred rats of Wistar strain were used for evaluation. The animals were fed ad libitum with commercial pellet diet [Lipton India Ltd., Mumbai] and had free access to water.

Acute toxicity studies: The animals were fasted overnight prior to the experimental procedures. For the study Up & Down or *Staircase* method was adopted. [7]

Treatment of animals

The animals were segregated into 4 groups of six in each. Group I animals served as normal control, Group II animals were intoxicated with CCl_4 (0.7 ml/kg body weight) intraperitoneally on the 3^{rd}, 6^{th} and 10^{th} day. Group III animals were treated with ethanolic root extract (300mg/kg b.w) orally for 10 days and CCl_4 (0.7 ml/kg body weight) intraperitoneally on the 3^{rd}, 6^{th} and 10^{th} day. Group IV animals were treated with Liv.52 (1ml/kg b.w) orally for 10 days and CCl_4 (0.7 ml/kg body weight) intraperitoneally on the 3^{rd}, 6^{th} and 10^{th} day.

On the 10^{th} day one hour after the last CCl_4 injection, the animals were sacrificed by cervical dislocation and the blood was collected from the carotid artery, serum separated and used for the analysis of serum glutamate oxaloacetate transaminase (SGOT), serum glutamate pyruvate transaminase (SGPT) and serum alkaline phosphatase (SALP) liver was isolated and weighed.

Analysis of SGOT, SGPT and SALP

The collected blood from each rat was centrifuged at 3000rpm for 10 minutes to separate serum for the analysis of SGOT, SGPT and SALP levels.

Changes in Liver weight

After collection of blood, liver was isolated from each animal and weighed, the changes in the weight were noted for each group.

Statistical analysis

The significance between the groups was analyzed by One way analysis of variance (ANOVA) followed by Dennett's test.

Results

It has been observed that the ethanolic root extract of *Musa paradisiaca* at a dose of 300mg/kg orally has significantly lowered ($p<0.01$) the CCl_4 induced elevated levels of SGOT, SGPT and SALP when compared with CCl_4 intoxicated group. The rats intoxicated with CCl_4 alone have shown a drastic increase in the levels of these enzymes. The changes in the liver weight of extract treated group showed a significant reduction ($p<0.01$) when compared with the liver weight of CCl_4 intoxicated group

Discussion

The efficacy of any hepatoprotective drug is essentially dependant on its capability of either reducing the harmful effects or in maintaining the normal hepatic physiological mechanism, which have been imbalanced by a hepatotoxin. Carbon tetrachloride is a widely used experimental hepatotoxin, when injected into rats it accumulates in hepatic parenchymal cells leading to destruction of hepatocytes and fatty deposition. At the same time CCl_4 is metabolized to $*CCl_3$ free radical, which results in the formation of lipid radicals these lipid radicals react with the molecular oxygen to produce peroxy radicals leading to lipid peroxidation.

An antioxidant effect has been reported to play a crucial role in hepatoprotective activity of medicinal plants. The damaged hepatocytes release all its cell contents into the blood stream. Thus elevation of these enzymes such as SGOT, SGPT and SALP in blood serum indicates membrane damage. The treatment with ethanolic root extract for 10 days has shown good protection by reducing the elevated enzyme levels nearing to normal values. The change in the liver weight is observed in case of CCl_4 intoxicated group, but the treated group values were near to normal. Thus from the results of the current investigation it may be inferred that ethanolic extract of the roots possess significant hepatoprotective activity. Further studies regarding the isolation and characterization of active principles responsible for hepatoprotective property are suggested.

Table. 1

Effect of ethanolic root extract of *Musa paradisiaca* on serum enzyme levels and liver weight in rats (n=6).

Group	SGOT (IU/L)	SGPT(IU/L)	SALP(IU/L)	Liverweight(g)
Normal control	373±1.512	56.5±1.234	196.33±1.941	**3.31±0.119**
CCl4 intoxicated	752.5±1.773	255.3±1.684	446.33±1.784	**4.47±0.123**
Extract Treated	534±1.432**	123±1.556**	347±1.437**	**3.93±0.082****
Liv.52 treated	**401±1.902****	**74±1.328****	**221.5±1.702****	**3.48±0.084****

The values are expressed as Mean ± SEM. **p<0.01 is significant on comparison with CCl_4 intoxicated group (ANOVA followed by Dunnett's test)

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