

SHORT COMMUNICATION

Hepatoprotective Activity of *Phyllanthus lawii* against Carbon Tetrachloride-induced hepatic damage in rats.K S Chandrashekar*¹, K S Prasanna²¹Nitte gulabhi Shetty Memorial Institute of Pharmaceutical Sciences, Mangalore, India²FatherMuller Medical College, Mangalore, India

Received 19 April 2010; Revised 3 May 2010; Accepted 5 May 2010

ABSTRACT

The aerial parts of *Phyllanthus lawii*, family Euphorbiaceae was tested for hepatoprotective activity against CCl₄ in rats. The ethanol extract of *Phyllanthus lawii* has shown significant activity, lowering the serum enzymes like SGOT and SGPT in rats intoxicated with CCl₄. *Phyllanthus lawii* also reversed the histopathological change induced by CCl₄, there by justifying the folk use of the plant.

Key Words: *Phyllanthus lawii*, Hepatoprotective, Carbon tetrachloride.

INTRODUCTION

Different species of *Phyllanthus* are considered to be very effective hepatoprotective agents in the Indian indigenous systems of medicine and are considered bitter, astringent, stomachic, diuretic, febrifuge, deobstruant and antiseptic. Still ayurvedic practitioners prescribed fresh juice of 'Bhuiamlki' for jaundice. Various species of *Phyllanthus* are being sold in India under the trade name 'Bhuiamlki'¹. Therefore *Phyllanthus lawii*, family Euphorbiaceae is taken up for screening of hepatoprotective activity.

MATERIAL AND METHOD

The aerial parts of *Phyllanthus lawii* were collected from local areas of Mangalore district, Karnataka and were authenticated by Prof. Gopal Krishna Bhat, Department of Botany, Poorna Prajna college, Udupi. A voucher specimen has been preserved in our laboratory. The aerial parts of the plant were collected and sun dried. The dried and powdered aerial parts of the plant (300gm) were extracted with ethanol using soxhlet apparatus and concentrated *in-vacuo*. Approximately, 0.50g of dried ethyl acetate extract was obtained from 10 g of dried stem material. The extract was suspended in 5% gum acacia and used for studying hepatoprotective activity.

PHARMACOLOGICAL ACTIVITY

Male albino rats weighing between 150 g

and 175 g were used as animal models. The rats were divided into four groups, each group consisting of six animals. Hepatoprotective activity of *Phyllanthus lawii* was evaluated using CCl₄-induced model². 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 *Phyllanthus lawii* (400 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 analysed for various biochemical parameters

Biochemical parameters like serum glutamic oxaloacetic transaminase (SGOT) and serum glutamic pyruvate transaminase (SGPT) were determined by Reitman and Frankel method³. Serum alkaline phosphatase was determined by King and Kings method⁴. Malby and Evelyn method⁵ was followed to estimate total bilirubin content.

The liver was examined grossly, weighed and stored in formalin 10% and were processed for paraffin embedding using the standard microtechnique⁶. A section of the liver (5µm) stained with alummhemotoxylin and eosin was observed microscopically for histological studies.

RESULT & DISCUSSION

The results of biochemical parameters revealed 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 acute hepatic diseases, SGPT which is slightly elevated by cardiac necrosis is a more specific indicator of liver disease⁷. A significant reduction ($P < 0.01$) was observed in SGPT, SGOT, ALP and total bilirubin levels in the groups treated with silymarin and ethyl acetate extract of *Phyllanthus*

lawii. The enzyme levels were almost restored to the normal.

It was observed that the size of the liver was enlarged in CCl₄-intoxicated rats but it was 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.

Table 1. Effect of ethanol extract of *Phyllanthus lawii* on CCl₄ treated rats

| Design of treatment | Liver (wt/100g body wt) | Dose (mg/kg) | SGPT U/L | SGOT U/L | ALP U/L | Total Bil (mg %) |
|------------------------------------|-------------------------|--------------|----------------|--------------|----------------|------------------|
| Control | 3.3 ± 0.011 | - | 131.5 ± 1.99 | 45.3 ± 0.81 | 162.5 ± 3.29 | 0.72 ± 0.03 |
| CCl ₄ | 6.5 ± 0.31 | 1.25 ml/kg | 221.2 ± 4.5 | 345.5 ± 2.8 | 389.6 ± 18.25 | 2.12 ± 0.01 |
| Silymarin + CCl ₄ | 3.6 ± 0.22* | 100 | 133.0 ± 1.17** | 82.2 ± 9.11* | 215.6 ± 5.47** | 0.9 ± 0.08* |
| Ethanol extract + CCl ₄ | 4.5 ± 0.13* | 400 | 114.2 ± 1.16* | 65.0 ± 5.29* | 294.6 ± 5.52* | 0.82 ± 0.01 |

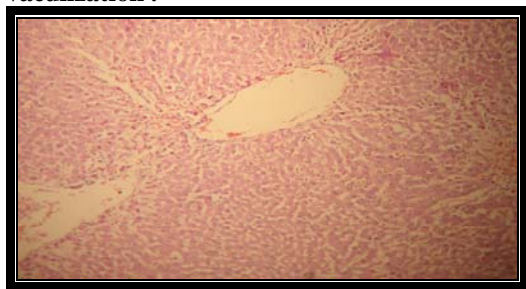
N = 6 animals in each group.

* $P < 0.001$; ** $P < 0.01$ when compared with control.

Values are expressed as mean ± SE.

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.

Fig 1. Section of liver showing centrilobular necrosis and vaculization .



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 thereby justifying its use in traditional system of medicine.

REFERENCES

1. Sayyada K, Vartika R, Ajay KS, Rawath and Shanta M. Comparative pharmacognostic studies of three *Phyllanthus* species. *J Ethnopharmacol*, 2006; 104: 79-86.
2. Sethuraman MG, Lalitha KG and Raj KB. Hepatoprotective activity of *Sarcostemma brevistigma* against carbon tetrachloride-induced hepatic damage in rats. *Current Science*, 2003; 84: 1186.
3. Reitman S. and Frankel S. *Invitro* determination of transaminase activity in serum. *Am J Clin Path.* 1975; 28: 56.
4. Kind PN and King EJ. *Invitro* determination of serum alkaline phosphatase. *J Clin Path.* 1971; 7: 322.
5. Mallery HT and Evelyn KA. Estimation of serum bilirubin level. *J Biol Chem.* 1937; 119: 481-82.
6. Galigher AE and Kozloff EN. *Essential Practical Microtechnique*, Lea and Febiger, Philadelphia. 1971; 2nd edn.:77-79.
7. Rodwell VW, Martin DW, Mayg PA and Garnner DK. *Harper Review of Biochemistry*, Lange Medical Publisher, California. 1983; 20th edn: 62-65.