



HEPATOPROTECTIVE EFFECT OF ECLIPTA ALBA AND PHYLLANTHUS FRATURNUS EXTRACT IN ANIMAL MODEL (RATS)

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ABSTRACT

This exercise was undertaken to study the hepatoprotective effect of Eclipta Alba and Phyllanthus fraturus extract in CCl4 treated rats. CCl4 induced fatty liver and liver cell necrosis in the rats. 60 male albino rats each weighing not less than 150 gm were divided into 6 groups with 10 animals in each group. The groups included-a control, group treated with CCl4, group-treated with Liv-52 and 3 groups receiving the plant extracts isolated and in combination. The rats were sacrificed under light ether anaesthesia and diagnostic estimations were done to assess the liver functions. Biochemical study indicated high levels of SGPT & SCOT in CCl4 treated rats: 450.33±161.25 and 605.66 ± 16.67 respectively. Eclipta alba managed to bring down the levels to 223.47 ± 105.79 and 444.67 ± 76.62 respectively whereas phyllanthus fraturus treated rats indicated readings of 341.66 ± 22.47 and 428.33 ± 9.5 respectively . Histopathological studies revealed less congestion and very less fatty changes in the extract treated rats. Eclipta alba group had minimum abnormal changes. The profile appears to suggest marked beneficial effect of plant extracts in liver damage produced by CCl4.

KEYWORDS

Eclipta Alba	Phyllanthus fraturus	SGPT
Carbon tetrachloride (CCl4)	Fatty Liver	SGOT

INTRODUCTION :

There is no specific treatment for infective hepatitis in modern medicine. However there are several remedies suggested in Ayurvedic medicine. The extracts of Eclipta alba, Eclipta prostrate and Phyllanthus fraturus are being commonly and regularly used as a Folk-lore medicine in the South of our country for the treatment of infective hepatitis (1,2).

In order to study the efficacy and safety of this plant extract, the plant was identified, brought all the way from Tamilnadu and was cultivated in Sevagram, This study was carried out to test this extract in rats after inducing damage to the liver with carbon tetrachloride which induces fatty liver and liver cell necrosis (3) as ICMR Research Project in Department of Pharmacology MGIMS, Sewagram, Wardha (M.S.) from Jan'2010 to Apr'2010

MATERIALS AND METHODS :

Eclipta alba and Phyllanthus fraturus extract: It was prepared by drying the leaves of the plants and then evaporating the alcohol added, in shadow.

Drugs and chemicals : CC14 (Qualigens fine chemicals, Bombay), Liv-52 (Himalaya Drug Co., Bombay), GOT, GPT estimation kits (Kasturba Hospital, Sevagram).

Experimental animals : 60 male albino rats each weighing not less than 150 gm were divided into 6 groups with 10 animals in each group. The rats had free access to commercial pellet diet (Goldmohr rat feed, Lipton India Ltd.) and water.

- Group I : was treated with CC14
- Group II : plant extract – No. 1. (Eclipta alba)
- Group III : plant extract – No. 2. (phyllanthus fraturus)

- Group IV : plant extract – No. 1 + 2
- Group V : Liv 52 - an Ayurvedic preparation.
- Group VI : Control.

The details of the procedure are as follows.

TREATMENTS :

- Group I : CC14 + groundnut oil mixture injected LP. 0.1 ml / kg body weight. 3 doses on alternate days (1st, 3rd, 5th day), sacrificed on 6th day.
- Group II : Eclipta alba fed orally for 10 days 100 mg/kg body weight. CC14 + groundnut oil injected LP. on 6th, 8th, 10th day (0.1 ml / kg), sacrificed on 11th day.
- Group III : Phyllanthus fraturus fed orally for 10 days, 100 mg/kg body weight. CC14 + groundnut oil injected LP. on 6th, 9th, 10th day (0.1 ml/kg); sacrificed on 11th day.
- Group IV : Eclipta alba + phyllanthus fraturus fed orally for 10 days 100 mg/kg body weight each. CC14 + groundnut oil injected I.P. on 6th, 8th, 10th day (0.1 ml/kg), sacrificed on 11th day.
- Group V : Liv 52 fed orally for 10 days (1 ml/kg body weight) CC14 + groundnut oil injected I.P. on 6th, 8th, 10th day (0.1 ml/kg). Sacrificed on 11th day (4).
- Group VI : Distilled water fed orally (1 ml/kg body weight). Groundnut oil injected on 6th, 8th, 10th day (0.1 ml/kg). Sacrificed on 11th day.

All rats were sacrificed under light ether anaesthesia and the following diagnostic estimations were done to assess the liver functions. Biochemical study :

The blood extracted from the rats was centrifuged and the serum was estimated for the levels of following enzymes:

- 1) SGPT (Serum Glutamate Pyruvate Transaminase)
- 2) SGOT (Serum Glutamate Oxaloacetate Transaminase) (5)

Histopathological study :

Small pieces of liver tissues were collected in 10% formalin for proper fixation. These tissues were processed and embedded in paraffin wax. Sections of 5-6 microns in thickness were cut and stained with haematoxylin and eosin (6).

RESULTS :

The results obtained from biochemical estimation are tabulated and statistically analysed in Table 1.

Table 1 :
EFFECT OF ECLIPTA ALBA & PHYLLANTHUS FRATRURNUS EXTRACTS ON BIOCHEMICAL PARAMETERS IN RATS SUBJECTED TO CCL INDUCED TOXICITY.

Group	Biochemical parameter	SGPT \pm S.D.		SGOT \pm S.D.	
		Mean	S.D.	Mean	S.D.
I.	CCl ₄	450.33	161.25	605.66	16.67
II.	Eclipta alba	223.47	105.79	444.67	76.62
III.	Phyllanthus fratrurnus	341.66	22.47	428.33	9.5
IV.	Eclipta alba + Phyllanthus fratrurnus	354.66	34.99	455.21	28.58
V.	Liv 52	380.33	116.97	476.66	19.42
VI.	Control	035.37	7.23	339.31	9.33

Group	Dose
I	0.1 ml/kg body wt.
II	100 mg/kg body wt.
III	100 mg/kg body wt.
IV	100 mg/kg body wt. (each drug)
V	1 ml /kg body wt.
VI	1 ml /kg body wt.

Significant difference : I & II, III, IV
I & II, III, IV, V

between groups VI & I, II, III, IV, V
VI & I, II, III, IV, V

HISTOPATHOLOGICAL STUDY :

Liver from control group showed normal appearance, smooth and regular under surface without any evidence of haemorrhage and necrosis. CCl₄ treated livers showed multiple area of necrosis. Most of livers were covered with white slough and there were multiple white patches. The undersurface of most of the livers were irregular. Livers from Eclipta alba, phyllanthus fratrurnus and Liv 52 groups showed mild haemorrhage and minimum fatty changes, Eclipta alba group being almost near normal.

Histology of liver from control group showed aortal triad, rows of hepatocytes or normal arrangement of hepatocytes with nuclei, while CCl₄ treated liver sections showed intense centrilobular necrosis, sinusoidal congestion and extensive fatty changes. Hepatocytes in centrilobular zone were enlarged and contained lipids. Hepatocytes in periportal zone were also enlarged and normal architectural pattern was destroyed with severe vacuolization of surviving periportal hepatocytes.

In Phyllanthus fratrurnus and Eclipta alba treated rats there was less congestion and very less fatty changes. Liv 52 group also showed similar characters. Eclipta alba group had the minimum abnormal changes.

DISCUSSION :

Carbon tetrachloride is known to cause fatty infiltration and

liver cell necrosis, CCl₄ gets converted to trichloromethyl radical which is toxic reactive metabolite (7). This activated radical binds covalently to the macromolecules and induces peroxidative degradation of membrane lipids of endoplasmic reticulum rich in polyunsaturated fatty acids. This lipid peroxidative degradation of biomembranes is one of the principle causes of hepatotoxicity.

Our findings confirmed the hepatotoxicity of CCl₄ and free radical mechanisms suggested for the toxic effect of this chemical. CCl₄ induced lipid peroxidation was inhibited significantly in Eclipta alba, Phyllanthus fratrurnus and Liv 52 treated groups. A possible mechanism of Eclipta alba and Phyllanthus fratrurnus as hepatoprotective agent could be an antioxidant effect and is comparable to that of Liv 52.

CONCLUSION :

Biochemical data of the present study showed significant lowering of SGPT and SGOT from their elevated levels following Eclipta alba and Phyllanthus fratrurnus extract administration.

It is difficult to infer the exact molecular and biochemical mechanism responsible for prevention of CCl₄ induced liver damage but the observations suggest marked beneficial effect of the plant extracts in liver damage produced by CCl₄.

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