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ANTIHEPATOTOXIC ACTIVITY OF ECLIPTA ALBA, TEPHROSIA PURPUREA AND BOERHAAVIA DIFFUSA

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ABSTRACT: *Alcoholic and chloroform extracts of* ***E. alba T. purpurea*** *and* ***B. diffusa*** *were screened for antihepatotoxic activity. The extracts were given after the liver was damaged with CCl4. Liver function was assessed based on liver to boy weight ratio, pentobarbitone sleep time, serum levels of transaminase (SGPT, SGOT), alkaline phosphatase (SALP) and bilirubin. Alcoholic extract of* ***E. alba*** *was found to have good antihepatotoxic activity.*

INTRODUCTION

In traditional medicine, various herbal preparations are being used for treating liver disorders. In the absence of an effective treatment in modern medicine, efforts are being made to find suitable herbal drugs.

The plants *Eclipta alba* (fam : Compositae), *Tephrosia purpurea* (fam: Nycttagynaceae) are well known in traditional medicine for their medicinal properties. *E.alba* is widely used in the treatment of liver and gall bladder ailments (1-3). It is juice in combination with honey is administered for catarrh and jaundice. The protective effect of *E. alba* on CCl4 induced acute liver damage in rats was reported (4,5). The alcoholic extract of *E. alba* showed the presence of reducing sugars, desmethyl wedelolactone and a new glycoside desmethl wedelolactone 7 – glucoside (6). The alcoholic extract of the entire plant was reported to have antiviral activity against Raniket disease (7). Aqueous extract of *T. purpurea* was reported to possess liver protective property (8). The aqueous and acetone extracts of *B. diffusa* were reported to increase the liver ATP – ase activity in albino rats (9).

Present study was designed to study the antihepatotoxic activity of alcoholic and chloroform extracts of *E. alba, T. purpurea* and *B.diffusa* in albino rats where the extracts were given after the liver damage was induced with carbon Tetrachloride.

Experimental

1. Plant materials

Whole plants of *alba, purpurea* and *diffusa* were collected from in and around Warrangal town and air dried in shade. The identity of these plants was confirmed by comparing with

standard herbarium specimens. Voucher specimens were deposited in pharmacognosy laboratory, of University College of Pharmaceutical Sciences, Kakatiya University, Warrangal.

2. **Preparation of Extract**

300 gm each of powdered material of *E.alba, T. purpurea* and *B. diffusa* were extracted by double maceration at room temperature with chloroform and 95% alcohol separately. The extracts were concentrated in vacuum using rotary flash evaporator and dried on a dessicator.

3. **Animals**

Albino (Wistar) rats were procured from IDPL, Hyderabad and bred in the College Animal House. They were fed on Commercial Diet (Hindustan Lever, Bangalore) and tap water ad libitum during the experiment.

Diagnostic reagent kits were procured from SPAN diagnostics Pvt. Ltd., Udhna (India) for the estimation of serum transaminase, (SGOT, SGPT) serum alkaline phosphatase (SALP) and serum bilirubin levels.

4. **Antihepatotoxic Studies**

Eight groups (I-VIII) comprising each of six albino rats of either sex weighing between 180 and 220 gm were selected. Liver damage was induced in groups II to VII by oral administration of 25% carbon tetrachloride in liquid paraffin at a dose of 1.25 ml/kg daily for five days. Group I served as control and received liquid paraffin daily for 5 days orally. From sixth day onwards, groups II to VII received once daily oral dose of either alcoholic or chloroform extracts of *E. alba, T. purpurea* and *B.diffusa* for seven days. The extracts were given at a dose of 200 mg/kg suspended in 0.7% Na-CMC mucilage. Group VIII was the untreated group. Group I and VIII received only the mucilage. On eighth day, sleep time was recorded in animals by injection sodium pentobarbitone at a single dose of 30 mg/kg i., in distilled water. Animals were sacrificed after the study, blood was collected in sterile centrifuge tubes and allowed to clot. Serum was separated and used for the estimation of SGPT, SGOT, SALP and serum bilirubin levels.

Assessment of Liver Function

1. **Morphological**

After the animals were sacrificed, the abdomen was cut open and the liver was taken out. The ratio of wet liver wight per 100 gm of animal body weight is computed and recorded.

2. **Biochemical**

SGPT, SGOT, SALP and Serum bilirubin levels were estimated in serum using standard diagnostic kits. SGPT and SGOT levels were estimated by the method of Reitman and

Frankel (0) and expressed in Karmen Units (KU). SALP levels were estimated using kind and king's (11) method and expressed in KA units. Serum bilirubin levels were estimated by Malloy and Evelyn (12) method and expressed in mg%.

3. **Functional**

Pentobarbitone sleep tie was recorded in all the groups on the last day of the treatment. The time passed between the loss of righting reflex and its regain was taken as the sleep time and expressed in minutes.

Results and Discussion

The average percentage yield of ethanolic (95%) extract of *E.alba, T. purpurea* and *B. diffusa* were recorded to be 17.2, 14.5 and 16.5 % W/W respectively. The corresponding values for chloroform extracts were 10.5, 12.1 and 10.6% W/W.

Table 1 shows the effect of chloroform and alcoholic extracts of *E. alba, T. purpurea* and *B. diffusa* in albino rats intoxicated with CCl4.

The values are represented as mean +S.D. The statistical significance was computed between treated and untreated groups using unpaired, one-tailed student's 't' test. The P values are given blow the Table.

An increase in liver weight, rise in serum transaminase (SGOT, SGPT), Serum alkaline phosphatase, serum bilirubin levels and pentobarbitone sleep time were reported after CCl4 intoxication (13 – 15). Increase in liver weight is due to accumulation of fat consequent to reduced rate of lipid peroxidation. High serum levels of transaminase indicate acute hepatocellular liver damage. It is evident from Table 1, that all the liver parameters were significantly increased due to CCl4 intoxication indicating hepatocellular liver damage.

Alcoholic extract of E. alba could able to reduce significantly the elevated levels & SGPT (258.8 + 13.64 to 134.5 + 8.57 KU), SGOT (2002 + 20.64 to 167.5 + 10.39 KU) SALP (205.2 + 15.85 to 151.7 to 10.11 KA units) and serum bilirubin (2.48 + 0.35 to 0.54 + 0.12 mg %). It also decreased the liver wight and pentobarbitone sleep time significantly. Chloroform, extract of E. alba was effective in reducing elevated SGPT, SGOT, SALP and Serum bilirubin levels. Liver weight and pentobarbitone sleep time were also not lowered.

The alcoholic and chloroform extracts of R. communis and T. purpurea failed to exhibit any significant antihepatotoxic activity in terms of SGPT, SGOT, SALP and Serum bilirubin levels.

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TABLE – 1

EFFECT OF ALCOHOLIC AND CHOLOROFORM EXTRACTS OF E.ALBA, T. PURPUREA AND B. DIFFUSA ON RATS INTOXICATED WITH CCL4

Group	Liver wt. per 100 gm. Body wt., gm Mean + S. D	SGPT (KU) Mean + S. D	SGPT (KU) Mean + S. D	SALP (KA) (mg %)	Serum bilirubin (min) Mean + S. D.	Sleep time Mean + S. D.
Control	315 + 0.15 **	53.5 + 7.18 **	147.0 + 10.53**	146.6 + 7.20**	0.39 + 0.08**	40.3 + 4.32 **
CCl4 treated	4.12 + 0.21	258.8 + 13.64	202.0 + 15.85	205.2 + 15.85	2.48 + 0.35	184.0 + 15.21
E. alba (a/c)	3.52 + 0.08*	134.5 + 8.57 **	167.5 + 10.39*	151.7 + 10.11**	0.54 + 0.12 **	133.2 + 10.71**
E. alba (chl)	3.93 + 0.15	241.0 + 18.47	216.3 + 19.87	190.5 + 15.27	2.23 + 0.36	173.2 + 10.61
T. purpurea (a/c)	4.08 + 0.23	239.3 + 8.45	205.0 + 14.71	204.5 + 18.21	3.07 + 0.33	175.0 + 11.21
T. purpura (Chl.)	4.32 + 0.22	247.2 + 14.20	206.3 + 15.73	205.2 + 13.26	3.05 + 0.45	191.7 + 12.90
B. diffusa (a/c.)	3.93 + 0.23	236.5 + 11.22	208.3 + 16.46	191.7 + 16.61	3.17 + 0.33	225.7 + 14.46
B. diffusa (Chl.)	4.12 + 0.22	242.1 + 15.76	243.8 + 15.09	200.7 + 18.44	2.93 + 0.22	201.0 + 14.75

Animals in each group = 6

** Significant reduction at P<0.001 ; * - Significant reduction at p < 0.005

a/c. – Alcohol extract; Chl. Chloroform extract

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