INTERNATIONAL JOURNAL OF PHARMACEUTICAL RESEARCH AND NOVEL SCIENCES

IJPRNS

HEPATOPROTECTIVE ACTIVITY OF *EICHHORNIA CRASSIPES* WHOLE PLANT EXTRACTS IN PARACETAMOL INDUCED HEPATOTOXICITY IN RATS

M.Suresh babu*, V.Sandya Rani

Department of Pharmacology, JITS College of Pharmacy, Kalagampudi, West Godavari, Andhra Pradesh, India

ABSTRACT

The study was aimed to investigate phytochemical constituents and the Hepatoprotective activity of *Eichhornia crassipes* whole plant extracts in Paracetamol induced Hepatotoxicity in rats. *Eichhornia crassipes* whole plant extracts also produce significant prevention in Paracetamol induced rise in SGOT, SGPT, ALP and BIT. the present study indicates the *Eichhornia crassipes* extracts posses statistically significant Hepatoprotective activity is similar with the standard drug silymarin.

Key words: *Eichhornia crassipes*, Paracetamol induced Hepatotoxicity, silymarin

Author for correspondence
M.Suresh babu,
Department of Pharmacology,
JITS College of Pharmacy,
Kalgampudi, Andhra Pradesh, India.
Email id: sureshbabu3377@gmail.com

INTRODUCTION

Liver plays a major role in maintaining the biological equilibrium in vertebrates. The spectrum functions include metabolism, deposition of chemicals (xenobiotics) to which the organ is exposed directly or indirectly; metabolism of lipids, carbohydrates and proteins; blood coagulation and immunomodulation. Liver plays a major role in detoxification processes and also an important role in synthesizing useful principles. Therefore damage to the liver is inflicted by hepatotoxic agents is of grave consequences. There is an ever increasing need of an agent which could protect it from such damage. Liver diseases pose complications in treating them throughout the world since; conventional or synthetic drugs used in the treatment of liver diseases are few with risk of serious side effects. This is one of the main reasons for many people over the world including those in developed countries for turning towards complementary and alternative medicine. Several compounds including clinically useful drugs can cause cellular damage through the metabolic activation of the parent compound to highly reactive substance and also provoking the generation of oxygen derived free radicals such as non-carboxylic acid, non-steroidal anti inflammatory drug that has been widely used for the treatment of a variety of inflammatory and pain condition. If the drug is consumed in overdoses or for a longer period people with weak liver function suffers severely with unpredictable hepatic problems. It has been reported that the drug can cause several types of liver damage, ranging from mild abnormal function such as increase in serum amino transferase

activity to severe organ injuries such as hepatocellular necrosis or intrahepatic cholestatis. In view of severe undesirable side effects of synthetic agents and their interest in traditional or herbal medicines with scientific approach is on rise. About 600 commercial preparations with claimed liver protecting activity are available all over the world. About 100 Indian medicinal plants belonging to 40 families are used in herbal formulation. Liver damage can be assessed by various biomarkers such as cellular necrosis, increase in tissue lipid peroxidation and depletion in tissue GSH levels. In addition serum levels of many biochemical markers like SGOT, SGPT, triglycerides, cholesterol, bilirubin, alkaline phosphatase are elevated. In spite of phenomenal growth of modern medicine, only few synthetic drugs are available for the treatment of hepatic disorders. Various herbal formulations have been claimed to possess beneficial activity in treating hepatic disorders. Very few synthetic drugs stimulate the liver function or offer protection to the liver from the damage or help in regenerating of hepatic cells. However, there are a number of drugs employed in traditional system of medicine for liver infections. Many formulations containing herbal extracts are sold in Indian market for liver disorders but management of liver disorder by simple and precise herbal drug is still an intriguing problem (1-3).

Aim of the study is to evaluate hepatoprotective activity of *Eichhoria crassipes* powder (HRP) Extracts in paracetamol induced toxicity in albino rats of either sex by estimating marker enzymes in serum – serum glutamate oxaloacetate transaminase (SGOT), serum glutamate pyruvate transaminase (SGPT), alkaline phospatase (ALP) and serum total bilirubin.

MATERIALS AND METHODS

Collection of plant material

The *Eichhornia crassipes* plants were collected from near to our campus A.K.R.G College of pharmacy at NALLA CHERUYU, Nallajerlla. The plant was authenticated by Dr K. murali head of department of Botany, D.N.R.College Bhimavaram. The whole plant were dried in shade and powdered and stored in air tight container for the studies.

Successive solvent extraction

The powder material was subjected to Soxhlet apparatus. The solvents used are alcohol, ethylacetate and water. The powder material of *Eichhornia crassipes* powder were weighed and packed in soxhlet extractor for extraction for about 36 hours with different solvents. The temperature was maintained on an electric heating mantle with thermostat. The extracts were then concentrated and were air dried at room temperature, weighed and percentage yield was calculated. The color and consistency of the extracts were noted.

Experimental animals (4-7)

Albino rats (Wistar strain) of either sex weighing between 150-220g were procured from Ghosh Enterprises Mumbai for experimental purpose. After procuring the animals were acclimatized for seven days under standard husbandry conditions with 12 hours light/dark cycle. Adult male rats were collected and caged under hygienic conditions. Animals were fed with hygienic feed and pure water and kept under temperature 22 ± 2°C.

Paracetamol Induced Hepatotoxicity

The rats were selected and divided into 7 groups each containing 6 animals. Silymarin and plant extract was dissolved in water with 0.5% CMC suspension. The treatment protocol was planned in such a way that the whole plant extract in preventive aspect of paracetmol induced hepatotoxicity. The dose of PCM to induce the hepatic damage was selected as 3 g/kg body weight for 3 days. The dose of Silymarin used was 25 mg/kg body weight. The doses of *Eichhornia crassipes* powder ethyl acetate and alcoholic extracts were 300mg/kg and 600mg/ kg body weight. The treatment protocol is summarized and given below in table-1.

Table-1 The treatment protocol

Group1	Control: 5%CMCsolution(1ml/kg) p. o. once daily for 3 day
Group2	Toxicant: Paracetmol (3 g/kg) p. o. once daily for 3 days
Group3	Standard: Silymarin (25 mg/kg) p. o. + after 30 minutes Paracetmol (3 g/kg) p. o. for 3 days.
Group4	*Eichhoria crassipes* ethyl acetate extract (300mg/kg) p. o. + after 30 minutes Paracetmol (3 g/kg) p. o. for 3 days.
Group5	*Eichhoria crassipes* ethyl acetate extract (600mg/kg) p. o. + after 30 minutes Paracetmol (3 g/kg) p. o. for 3 days.
Group7	*Eichhoria crassipes* alcoholic extract (300mg/kg) p. o. + after 30 minutes Paracetmol (3 g/kg) p. o. for 3 days.
Group8	*Eichhoria crassipes* alcoholic extract (600mg/kg) p. o. + after 30 minutes Paracetmol (3 g/kg) p. o. for 3 days.

On 0 and 4th day blood sample was collected from all animals by retro orbital puncture method. Serum was separated by centrifugation (3000 rpm for 15 min) and is subjected for estimation of biochemical parameters (SGOT, SGPT, ALP and BIL).

Statistical analysis- Results were expressed as mean ± SEM. The difference among means was analyzed by unpaired student's t-test.

RESULTS AND DISCUSSION

Successive solvent extraction

The *Eichhornia crassipes* powder was subjected to maceration for 7 days. The percentage yield, color, consistency and solubility in water of different solvents are noted in table-1

Table- 2 Percentage yield, color, consistency and solubility in water of different ***Eichhornia crassipes*** **extracts**

Plant part used	Extract	%yeild	color	consistency	solubility
Eichhornia crassipes Whole plant	Methonolic	10%	Dark green	sticky	Insoluble (water)
	Ethyl acetate	9%	Dark green	Sticky	Insoluble (water)

Hepatoprotective activity

Aspartate amino transferase levels (AST or SGOT)

Paracetamol produced significant rise in serum SGOT levels from 63.3 IU/L to 334.25 IU/L (428.04% increases). Compared to normal control where increase was 62 IU/L to 67.8 IU/L (9.35% increases). In Paracetamol + Silymarin treated group the increase from 63.5 IU/L to 66.93 IU/L(5.40% increases). In Eichhornia crassipes ethylacetate and alcoholic extract (300 and 600 mg/kg body weight) The rise in SGOT levels are from 65.3 IU/L to 65.68 IU/L (0.58% increases), 65.1 IU/L to 56.15IU/L(13.5% increases), 64.8 IU/L to 66 IU/L(1.85% increases) and 60.1 IU/L to 59.95IU/L (0.99% increases) respectively after three days of the treatment (Fig-1).

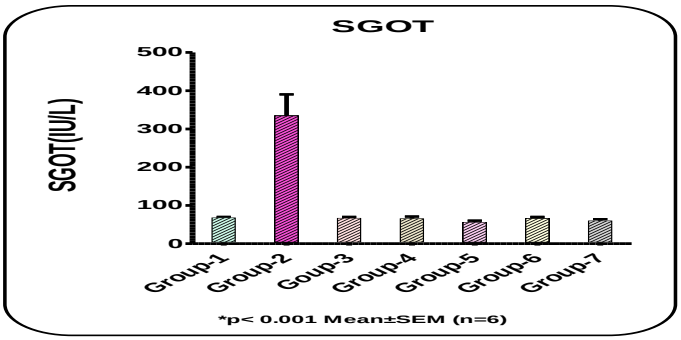

Fig-1 Influence of Eichhornia crassipes extracts on SGOT in Paracetamol induced hepatotoxicity Alanine amino transferase levels (ALT or SGPT)

Paracetamol produce significant rise in serum SGPT levels from 40.31 IU/L to 91.16 IU/L (126.20 % increases). Compared to Normal control where increase was 44.16 IU/L to 45 IU/L (2.04% increases). In Paracetamol + Silymarin treated group the increase from 44.16IU/L to 47.83 IU/L (8.31% increases). In Eichhornia crassipes ethylacetate and alcoholic extract (300 and 600 mg/kg body weight) The rise in SGPT levels are from 41.65 IU/L to 43 IU/L (3.36% increases), 43.5 IU/L to 44.83 IU/L (3.05% increases), 42.8 IU/L to 43.3 IU/L(1.16% increases) and 41.81 IU/L to 44.83IU/L (7.24% increases) respectively after three days of the treatment.

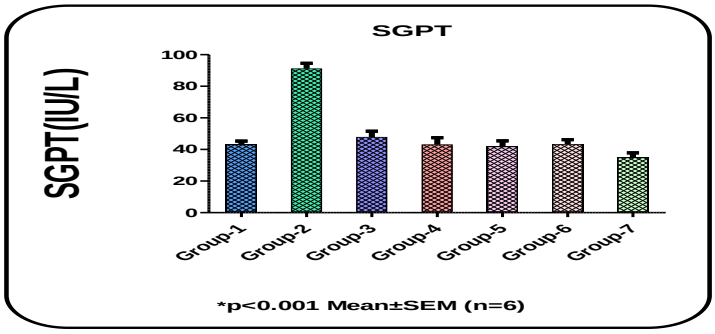

Fig-2 Influence of Eichhornia crassipes extracts on SGPT in Paracetamol induced hepatotoxicity Alkaline phosphates levels (ALP)

Paracetamol produce significant rise in serum ALP levels from 147 IU/L to 520 IU/L (253.74 % increases). Compared to Normal control where increase was 147.5 IU/L to180 IU/L (22.03% increases). In Paracetamol + Silymarin treated group the increase from 149 IU/L to 240 IU/L (61.18% increases). In Eichhornia crassipes ethylaceate and alcoholic extract (300 and 600 mg/kg body weight) The rise in ALP levels are from 147.5 IU/L to 210.80 IU/L (42.91% increases), 150 IU/L to 239.50 IU/L (59.66% increases), 147.3 IU/L to 248.16 IU/L (68.47% increases) and 157.3 IU/L to 256.5 IU/L (63.06% increases) respectively after three days of the treatment.

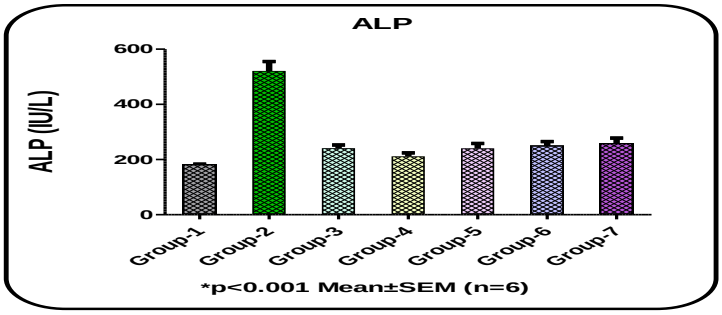

Fig-3 Influence of *Eichhornia crassipes* extracts on ALP in Paracetamol induced Hepatotoxicity

Bilirubin total levels (BTl)

Paracetamol produce significant rise in serum BIT levels from 0.66 mg/dl to 3.06 mg/dl (363.6 % increases). Compared to Normal control where increase was 0.77 mg/dl to0.80 mg/dl (3.89% increases). In Paracetamol + Silymarin treated group the increase from 0.56 mg/dl to 0.70 mg/dl (25% increases). In Eichhornia crassipes ethylacetate and alcoholic extract (300 and 600 mg/kg body weight) The rise in BIT levels are from 0.67 mg/dl to 0.77 mg/dl (1.14% increases), 0.66 mg/dl to 0.78 mg/dl (18.18% increases), 0.48 mg/dl to 0.56 mg/dl (16.66% increases) and 0.56 mg/dl to 0.67 mg/dl (19.64% increases) respectively after three days of the treatment.

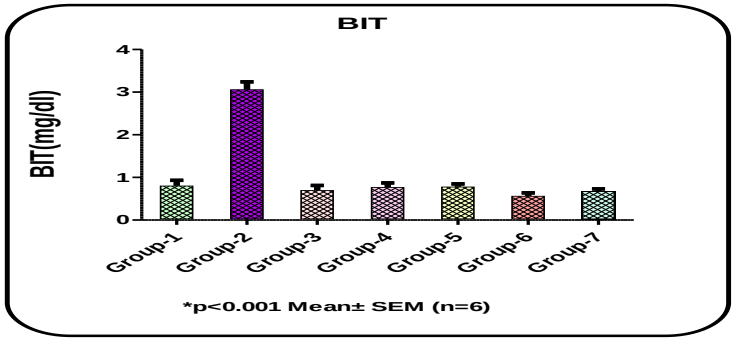

Fig-4 Influence of *Eichhornia crassipes* extracts on BIT in Paracetamol induced hepatotoxicity

CONCLUSION

The study was aimed to investigate phytochemical constituents and the Hepatoprotective activity of *Eichhornia crassipes* whole plant extracts in Paracetamol induced Hepatotoxicity in rats. Treatment with *Eichhornia crassipes* whole plant extracts also produce significant prevention in Paracetamol induced rise in SGOT, SGPT, ALP and BIT. The effect of silymarin was found to be in between the effect of selected doses of *Eichhornia crassipes* extracts. In conclusion, the present study indicates the *Eichhornia crassipes* extracts posses statistically significant Hepatoprotective activity is similar with the standard drug silymarin

REFERENCES

1. Anand Dewanchand , Ray KK, Ghatal JB, Arya KR. Histological evidence of protection by *Indigofera tinctoria* Linn, against CCl4 induced hepatotoxicity. *Ind J Exper Bio* (1981); 19: 298-300.
2. Anandan R, Devadi T. Hepatoprotective activity of *Picrorriza kurroa* on tissue defence system in D galactosamine induced hepatotoxicity in rats. *Fitoterapia* (1999);70:54-57.
3. Annie S, Sreenivasan KK. Chemical investigation and antihepatotoxic activity of the fruits of *Langenaria siceraria. Indian J Pharma Scien* (1998);58:197-202.
4. Anupam B, Alok S, Malay C. Hepatoprotective activity of carrot (*Daucus carota L*) against CCl4 intoxication in mouse liver. *J Ethanopharmacol* (1995);47:67-74.
5. Ashok C. Hepatoprotective activity of *Punica granatum*.Ind. Drugs (2001); 38(4):183-186.
6. Chaya Gadgole, Mishra S H, Anti hepatoprotective activtity of p-methoxy benzoic acid "*Capparis sponosa"*. *J Ethanopharmacology* (1999); 66:187-192.
7. Choksi S, Patel SS, Saluja AK. Silymarin a promosing herbal Hepatoprotective drug. *Indian Drugs* (2000); 37-(12):566-569.