e- ISSN 0976-0342
Print ISSN 2229-7456

International Journal of Pharmacy & Therapeutics

Journal homepage: www.ijptjournal.com

Research article

IN-VIVO HEPATOPROTECTIVE ACTIVITY OF *PHYLLANTHUS EMBLICA* (PHYLLANTHACEAE) AGAINST PARACETAMOL INDUCED LIVER DAMAGE IN WISTAR RATS

K.Dineshbabu* and C.N.Arulanand Raj

Department of Pharmaceutical analysis, College of Pharmacy, Mother Theresa Post and Research Institute of Health Sciences, Puducherry-605003, India.

ABSTRACT

The liver performs a vital role in metabolism, secretion, storage and detoxification of endogenous substances. There is a lack of reliable hepatoprotective drug in modern medicine to prevent and treat drug- induced liver damage. The aim of the study is to evaluate the hepatoprotective activity of *Phyllanthus emblica* (Phyllanthaceae) against paracetamol induced liver damage in wistar rats. The rats were divided into five groups(I to V) each group consisting of six animals. Group I animal is normal. Group II was treated with paracetamol (400mg/KgP.O). Group III, Group IV and Group V were treated with paracetamol + silymarin(200mg/KgP.O), Paracetamol + Low dose of MNK (dose 1) P.O and Paracetamol + High dose of MNK (dose 2)P.O respectively for seven days. On eighth day, the blood is collected through retro-orbital plexus and liver antioxidant enzymes were estimated by assessing the Alanine aminotransferase(ALT), Alkaline Phosphate (ALP) and Aspartate aminotransferase(ALP). The results obtained were effective and hence *Phyllanthus emblica* shows significant of hepatoprotective activity.

Key Words:- Hepatoprotective, *Phyllanthus emblica*, Paracetamol, Silymarin.

Access this article online

Home page: http://ijptjournal.com/

DOI: http://dx.doi.org/10.21276/ijpt.2018.9.4.5

Quick Response code

Received:02.10.18 **Revised**:12.11.18 **Accepted**:15.11.18

Corresponding Author

K.Dineshbabu
Department of Pharmaceutical analysis, College of Pharmacy, Mother Theresa Post and Research Institute of Health Sciences, Puducherry-605003, India.

Email:- dinesh.dinpharmaus@gmail.com

INTRODUCTION

Herbal formulations contain an active substance or herbal substance or herbal preparation in combination with one or more herbal preparation (Ali M, 1995). Herbal formulation are obtained by subjecting herbal substances to treatments such as extraction, distillation, expression, fractionation, purification, concentration or fermentation include comminuted or powdered (Shree Devi M & Parameswaran, 2018; Handa SS *et al*., 1986). Chronic liver disease involves a wide range of liver pathologies that include fatty liver, hepatitis, fibrosis, cirrhosis and hepatocellular carcinoma. The rising number of patients with liver dysfunction due to overwhelming usage of drugs and alcohol has paved the path for researchers in an interest in herbal medicine. The herbal medicines used for liver protection are silymarin (milk thistle), Liv-52, *Camellia sinensis* (green tea) and *Glycyrrhizag labra* (Liquorice) (Dossing M & Sonne J, 1993; CPCSEA Guidelines, 2003; Chauhan *et al*., 2009; Agharkar SP, 1991).

MATERIALS AND METHODS

ACUTE TOXICITY STUDIES OF *P.EMBLICA*:

6 animals of either sex divided into groups each of 3 animals. First 3 animals kept as control and remaining 3 animals are treated with single stat dose of 2000mg/Kg, P.O. MNK as per OECD guidelines 423. The treated groups were monitored for mortality and general behavior for 14 days. No toxicity was observed in

rats. Test doses of *P.emblica* were selected. (ie) 1/10th and 1/20th dose of 2000mg/Kg, P.O. as low dose and high dose respectively (Paranjpe P, 1999; Gandhiraja *et al*., 2009; Meenatchi Sundaram *et al*., 2009).

IN VIVO HEPATOPROTECTIVE ACTIVITY:

Table 1. Details of the plant specimen (Balakumar *et al*., 2011; Saraswat R & Pokharkar R, 2012)

S.No	COMMON NAME	BIOLOGICAL SOURCE	PARTS USED	QUANTITY REQUIRED
1	Amla	*Phyllanthusniruri* (Phyllanthaceae)	Aerial part	100g

Table 2. Details of animal

IAEC number	CPCSEA/1923/Re/AHF/MTPG&RIHS/2017
Strain and species	**Wistar Rats**
Gender	6 Female + 30 Either sex
Total No. Approved	**36**
Date of Issue	21/03/2019
Date of expiry	20/03/2020

Table 3. Details of drugs

DRUG	DOSE
Paracetamol	400mg/Kg, P.O.
Silymarin	200mg/Kg, P.O.
Phyllanthus emblica	Low dose, 250mg/kg P.O.
	High dose, 500mg/kg P.O

Table 4. Treatment of animals for seven days

S.No	GROUP	TREATMENT
1	Group I	Vehicle
2	Group II	Paracetamol (400mg/Kg, P.O.)
3	Group III	Paracetamol + Silymarin (200mg/Kg, P.O.)
4	Group IV	Paracetamol + (low dose)-*P.emblica* (dose-1), P.O.
5	Group V	Paracetamol + (high dose)-*P.emblica*(dose-2), P.O.

On eighth day, the blood was collected by retro-orbital plexus for estimation of ALT, ALP, AST. Liver was removed and histopathological studies were performed[14-21].

RESULTS AND DISCUSSION

Table 5. Effect of *P.emblica*on the ALT, AST and ALP (U/L) level following its pretreatment against the PCM-induced hepatic injury

PARAMETER	GROUP I (vehicle)	GROUP II (PCM 400mg/Kg)	GROUP III (Silymarin 200mg/Kg)	GROUP IV (*P.emblica*/250mg/kg, p.o)	GROUP V (*P.emblica*/500mg/kg, p.o)
ALT(U/L)	15.83±5.924	1714±142.2	588.1±193.7	1096±221.1	867.7±101.2
AST(U/L)	95.15±5.925	3008±210.7	959.2±338.8	207.6±409.4	1730±256.6
ALP(U/L)	115.7±6.994	330.0±42.35	195.5±11.06	264.8±29.77	256.3±13.91

Values are expressed as means ± SEM of six replicates. Significantly different as compared to control($p<0.001$)

Table 6. Histopathological scoring of the tissue of PCM- induced hepatic injury rats after pretreatment with *P.emblica*.

S.No	TREATMENT	STEATOSIS	NECROSIS	INFLAMMATION	HAEMORRHAGE
1	Normal	-	-	-	-
2	PCM (400mg/Kg)	+	+++	++	++
3	Silymarin(200mg/Kg) + PCM	-	+	+	-
4	*P.emblica* 250mg/kg + PCM	+	++	++	+
5	*P.emblica* 500mg/kg+ PCM	-	+	+	-

Figure 1. Effect of *P.emblica* on ALT

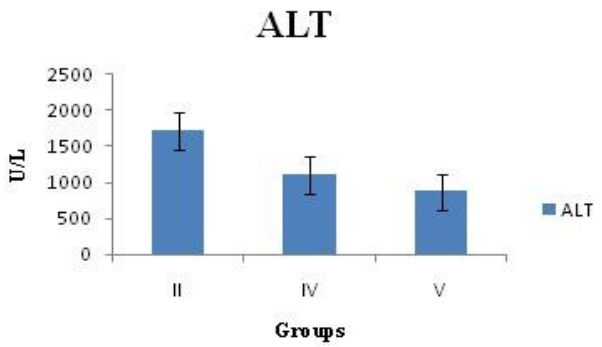


Figure 2. Effect of *P.emblica* on AST

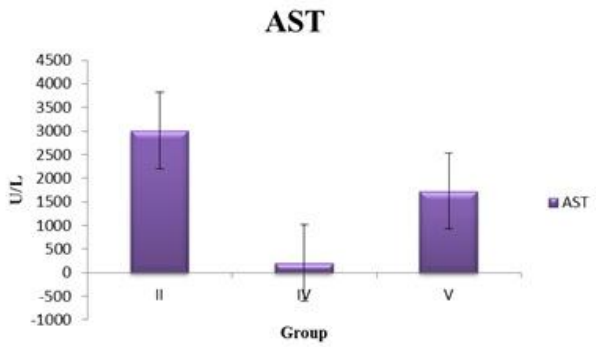
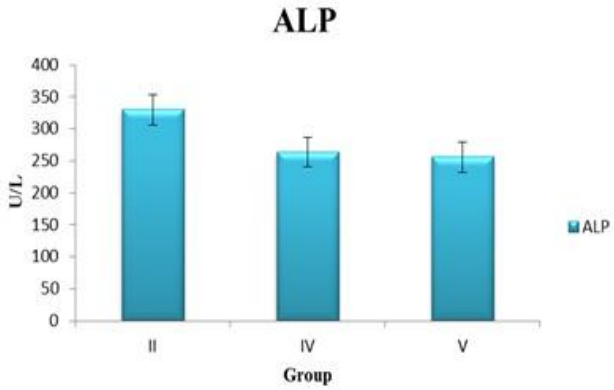


Figure: 3 Effect of *P.emblica* on ALP



HISTOPATHOLOGICAL STUDIES

Figure 4. GROUP I

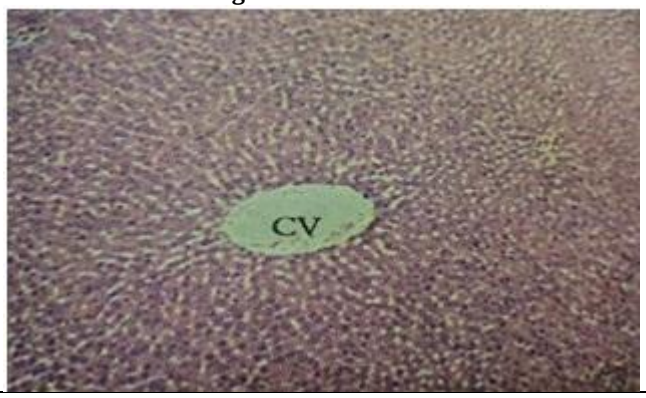


Figure 5. GROUP II

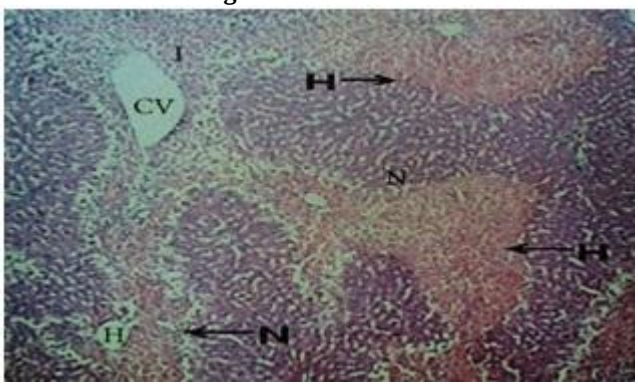


Figure 6. GROUP III

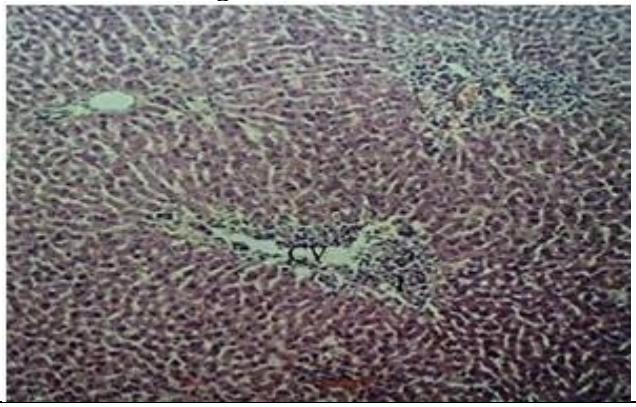


Figure 7. GROUP IV

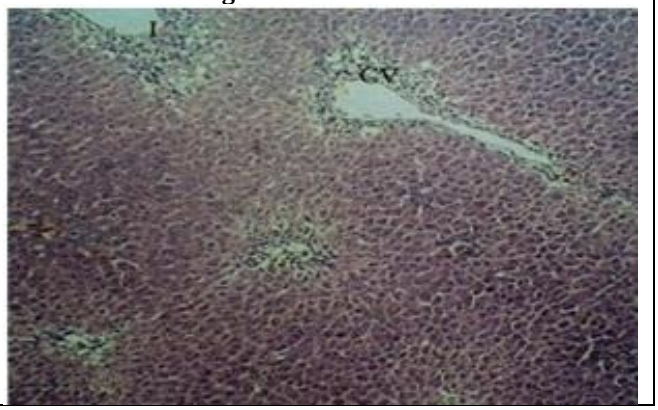
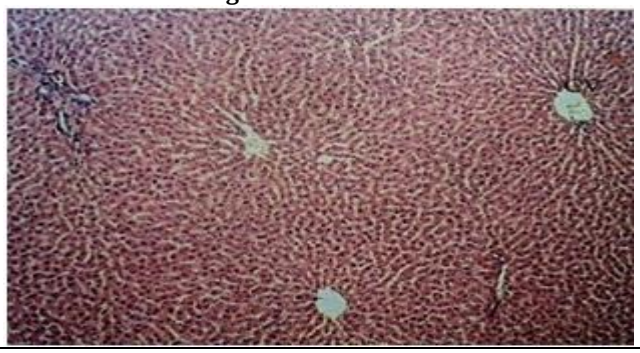


Figure 8. GROUP V



CONCLUSION

This drug is indicated for liver disease, anemia and jaundice. Though this drug is claimed as a hepatoprotective agent, there is no supportive scientific data available. This research work has created the scientific evidence for hepatitis. The data obtained from pharmacological studies, shows that *P.emblica* ameliorates the elevated levels of hepatic enzymes such as ALT, ASP and ALP. Histopathological studies reveal the effect of *P.emblica* in the protection of hepatotoxicity.

REFERENCES

Agharkar SP. Medicinal plants of Bombay Presidency. Pbl. Scientific publishers, Jodhpur, India: 1991,142-143.

Ali M. Indigenous traditional drugs: In Textbook of Pharmacognosy. 1st ed. Delhi: CBS Publishers and Distributors, 1994.

Balakumar S, Rajan S, Thirunalasundari T, Jeeva S. Antifungal activity of *Ocimum sanctum* Linn.(Lamiaceae) on clinically isolated dermatophytic fungi. *Asian Pacific Journal of Tropical Medicine*, 4(8), 2011, 654-657.

Chauhan, Bhagirath S. Johnson, Davi E. Germination, emergence, and dormancy of *Mimosa pudica*. *Weed Biology and Management*, 9 (1), 2009, 38–45.

CPCSEA Guidelines for laboratory animal facility. Committee for the purpose of experiments on animals. Indian Journal Pharmacol. 2003;35:257-274.

Dossing M, Sonne J. Drug Induced hepatic disorders: Incidence, management and avoidance. *Drug Safety*, 9, 1993, 441-9.

Gandhiraja N, Sriram S, Meena V, Srilakshmi K, Sasikumar C, Rajeshwari R. Phytochemical Screening and Antimicrobial Activity of the Plant Extracts of *Mimosa pudica* L. Against Selected Microbes. *Ethno botanical Leaflets*, 13, 2009, 618-24.

Handa SS, Chakraborty KK, Sharma A. Antihepatotoxic activity of some Indian herbal formulations as compared to silymarin. *Fitoterapia*, 57, 1986, 307.

Meenatchi Sundaram S, Priyagrace S, Vijayaraghavan R, Velmurugan A, Parameswari G, Michael A. Antitoxin activity of *Mimo sapudica* root extracts against *Najanaja* and *Bangarus caerulus* venoms. Bangladesh JPharmacol, 4, 2009, 105-109.

Paranjpe P. Indian medicinal plants: Forgotten healers. Pbl. Chaukhamba Sanskrit Pratisthan, Delhi, India: 1999,155-156.

Saraswat R, Pokharkar R. GC-MS Studies of *Mimosa pudica*. International Journal of Pharm Tech Research, 4(1), 2012, 93-98.

Shree Devi M, Parameswaran. Review of Kudineer used in Siddha system of medicine. *Journal of Indian medicine and Homoeopathy*, 2018, 34-40.

Cite this article:
Dineshbabu K and Arulanand Raj CN. *In-vivo* hepatoprotective Activity of *Phyllanthus emblica* (Phyllanthaceae) Against Paracetamol Induced Liver Damage In Wistar Rats**.** *International Journal of Pharmacy & Therapeutics*, 9(2), 2018, 135-138. DOI: **http://dx.doi.org/10.21276/ijpt.2018.9.4.5**