ejpmr, 2018,5(8), 448-453

SJIF Impact Factor 4.897

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

HEPATOPROTECTIVE EFFECT OF *JATROPHA CURCAS* FRUIT EXTRACTS AGAINST CARBON TETRACHLORIDE INDUCED LIVER FIBROSIS IN RATS

Andaluri Sowjanya*, G. Pitchaiah and D. Dhachinamoorthi

Department of Pharmacology, QIS College of Pharmacy, Ongole-523272.

***Corresponding Author: Andaluri Sowjanya**

Department of Pharmacology, QIS College of Pharmacy, Ongole-523272.

Article Received on 11/06/2018 **Article Revised on 01/07/2018** **Article Accepted on 21/07/2018**

ABSTRACT

The present study was undertaken to explore the hepatoprotective potential of *Jatropha curcas* fruit extracts against carbon tetrachloride (CCl_4) induced liver fibrosis in wistar rats. Liver fibrosis was induced by carbon tetrachloride (3ml/kg body weight) in animals. Blood biochemical, urine analysis and histological studies were carried to assess the hepatoprotective effect. Carbon tetrachloride administration induced severe liver fibrosis in rats, which was evident from enhanced levels of albumin, total bilirubin, direct bilirubin, indirect bilirubin, serum glutamate-O-methyl transferase, serum glutamate pyruvate transferase and alkaline phosphate. Pretreatment with silymarin (50mg/kg dose orally) significantly reversed carbon tetrachloride induced liver fibrosis. *Jatropha curcas* methanolic extract (250mg/kg body weight) showed significant effect than *Jatropha curcas* aqueous extract (250mg/kg body weight). From the obtained results it may be concluded that *Jatropha curcas* methanolic extract exerted a significant effect against CCl_4 induced hepatotoxicity in rats than *Jatropha curcas* aqueous extract ($p<0.001$) for most of the blood biochemical, urine analysis as well in attenuation of liver fibrosis.

KEYWORDS: Hepatoprotective, carbon tetrachloride, silymarin, *Jatropha curcas*, liver fibrosis.

INTRODUCTION

Liver is one of the major organs for biotransformation of drugs or chemicals. It not only helps in eliminating the therapeutically useful agents but also helps in the treatment of poisoning by enhancing the elimination of drugs or toxins. Certain drugs in excess dose or toxins through their reactive metabolites may cause liver injury because of the covalent or non covalent interactions with the liver cells. Therapeutically useful drugs like paracetamol, isoniazid, iproniazid, halothane, methotrexate, chlorpromazine, androgens, antimicrobials, certain toxins such as aflatoxins, carbon tetrachloride as well as alcohol can cause liver injury.[1]

MATERIALS AND METHODS

Animals

Wistar rats of either sex, weighing around 200- 250 g were employed in the present study. They were obtained from animal house of Chalapathi Institute of Pharmaceutical Sciences, Guntur. The rats are provided with standard conditions (12 hr cycle; 25^0 C room temperature, laboratory rat feed, e.g., Amrut® and water. The animals were acclimatized to the laboratory conditions for at least 5 days before the study. The experimental protocol was approved by the Institutional Animal Ethics Committee (IAEC) of Chalapathi Institute of Pharmaceutical Sciences, Guntur, Andhra Pradesh (Approval No: 09/IAEC/CIPS/2016-17; dt 05/04/2016) and care of the animals was taken as per standard operating procedures of the Committee for the Purpose of Control and Supervision of Experiments on Animals, Ministry of Forests, Environment and Climate Change, Government of India.

Plant material

The plant material consists of dried powdered fruit of Jatropha curcas Linn. belonging to the family Euphorbiaceae.

Preparation of plant extract

Fresh fruits of *Jatropha curcas* linn. Were collected from Ongole, Prakasam(Dt). India. The fruits were dried for one month and latter powdered. This powder was packed into the thimble then by using a soxhlet apparatus, it was run until the color turns to white by using methanol and aqueous extracts. Then it was evaporated by using a rotator evaporator until it gets dried.

Experimental groups

The efficacy of Jatropha curcas aqueous extract was compared with Jatropha curcas methanolic extract by evaluating in vivo hepatoprotective activity in rats against liver fibrosis.[13,18]

Five groups, each comprising of five wistar rats, were employed in the present study.

- Group I (Control group): Rats received only normal saline orally for 14 days.

- Group II (CCl4 - treated control group): Rats were administered CCl4 (3ml/kg, i.p.) on the day 14.
- Group III (Silymarin + CCl4 - treated group): Rats were treated with silymarin (50 mg/kg, orally) for 14 days. On the 14th day Silymarin was administered 60 min prior the administration of CCl4.
- Group IV (JCAE + CCl4 -treated group): Rats were treated with JCAE (250mg/kg body weight) for 14 days. On 14th day JCAE was administered 60 min before the administration of CCl4.
- Group V (JCME + CCl4 -treated group): Rats were treated with JCME (250mg/kg body weight) for 14 days. On 14th day JCME was administered 60 min before the administration of CCl4.

Parameters evaluated

a) Blood biochemical parameters: albumin (g/dl), total bilirubin (mg/dl), direct bilirubin (mg/dl), indirect bilirubin (mg/dl), SGOT (U/lit), SGPT (U/lit), ALP (U/lit).

b) Urine analysis: acetone / ketone bodies, bile salts, bile pigments, urobilinogen.

c) Histological studies of liver tissues.

RESULTS

Various pharmacological interventions employed in the present study did not show any significant mortality.

Effect on blood biochemical and urine analysis parameters

Administration of CCl4 (3ml/kg, i.p.) showed significantly increased levels of all blood biochemical parameters except decreased direct bilirubin levels, when compared to normal control group. JCAE and JCME treatment groups showed significant hepatoprotective effect ($p<0.001$) against CCl4 group as described in Table 1.

Silymarin (50 mg/kg, orally) pre-treated animals showed significant difference in SGOT, SGPT and in ALP which is evident from Table 1.

JCAE (250mg/kg body weight) pre-treated animals showed significant increased levels of all blood biochemical parameters except ALP.

JCME (250mg/kg body weight) to pre-treated animals showed significant increased levels of all blood biochemical parameters except ALP.

The urine analysis parameters of various treatment groups were found to be negative Table 2.

Table 1: Blood biochemical parameters of various treatment groups.

Sl.No.	Parameters	Group-I	Group-II	Group-III	Group-IV	Group-V
1	Albumin(g/dl)	4.74±0.15	5.4±0.57	5.29±0.07	4.08±0.26	4.5±0.24
2	Total Bilirubin(mg/dl)	0.64±0.09	0.79±0.01	0.66±0.08	0.52±0.05	0.72±0.05
3	Direct Bilirubin(mg/dl)	0.32±0.07	0.3±0.04	0.22±0.07	0.2±0.03	0.27±0.01
4	Indirect Bilirubin(mg/dl)	0.3±0.05	0.46±0.099	0.36±0.024	0.32±0.04	0.43±0.05
5	SGOT(IU/L)	294.8±21.73	785.6±19.94	170.4±20.06	307±41.14	459±14.17
6	SGPT (IU/L)	181.6±10.94	573.4±10.14	162±17.31	191±32.40	182.6±16.56
7	ALP(IU/L)	64.8±1.93	89±3.16	79.6±2.29	194±14.39	123±2.16

Table 1(a): Effect of various treatments on albumin.

Sl. No.	Parameters	Group-I	Group-II	Group-III	Group-IV	Group-V
1	Albumin(g/dl)	4.74±0.15	5.4±0.57	5.29±0.07	4.08±0.26	4.5±0.24

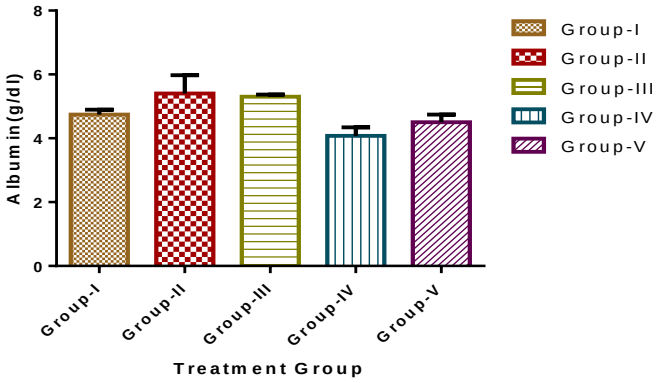


Figure 1: Effect of various treatments on albumin.

Table 1(b): Effect of various treatments on total bilirubin.

Sl.No.	Parameters	Group-I	Group-II	Group-III	Group-IV	Group-V
2	Total bilirubin(mg/dl)	0.64±0.09	0.79±0.01	0.66±0.08	0.52±0.05	0.72±0.05

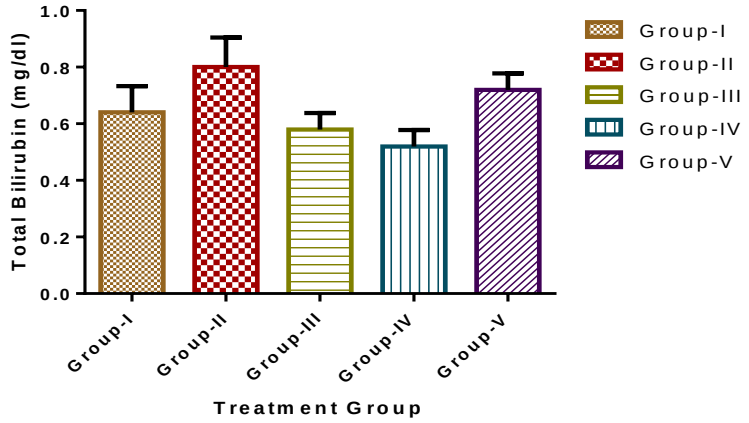


Figure 2: Effect of various treatments on total bilirubin.

Table 1(c): Effect of various treatments on direct bilirubin.

Sl.No.	Parameters	Group-I	Group-II	Group-III	Group-IV	Group-V
3	Direct bilirubin(mg/dl)	0.32±0.07	0.3±0.04	0.22±0.07	0.2±0.03	0.27±0.01

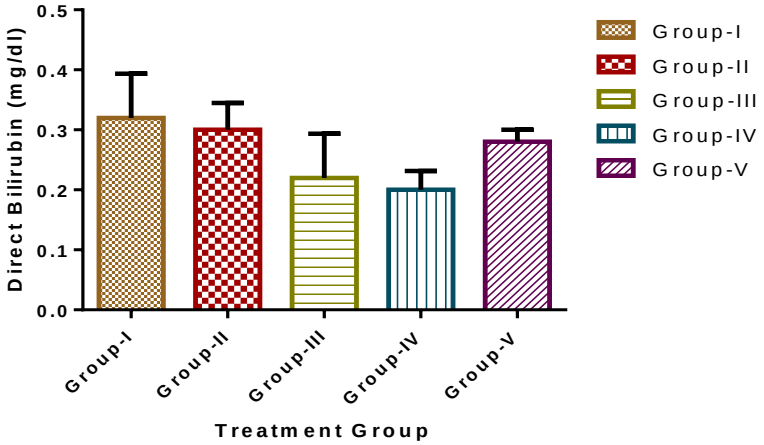


Figure 3: Effect of various treatments on direct bilirubin.

Table 1(d): Effect of various treatments on indirect bilirubin.

Sl.No.	Parameters	Group-I	Group-II	Group-III	Group-IV	Group-V
4	Indirect bilirubin (mg/dl)	0.3±0.05	0.46±0.099	0.36±0.024	0.32±0.04	0.43±0.05

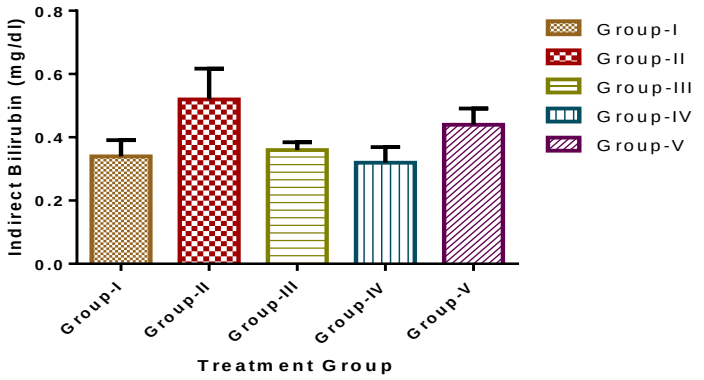


Figure 4: Effect of various treatments on indirect bilirubin.

Table 1(e): Effect of various treatments on SGOT.

Sl.No.	Parameters	Group-I	Group-II	Group-III	Group-IV	Group-V
5	SGOT(IU/L)	294.8±21.73	785.6±19.94	170.4±20.06	307±41.14	459±14.17

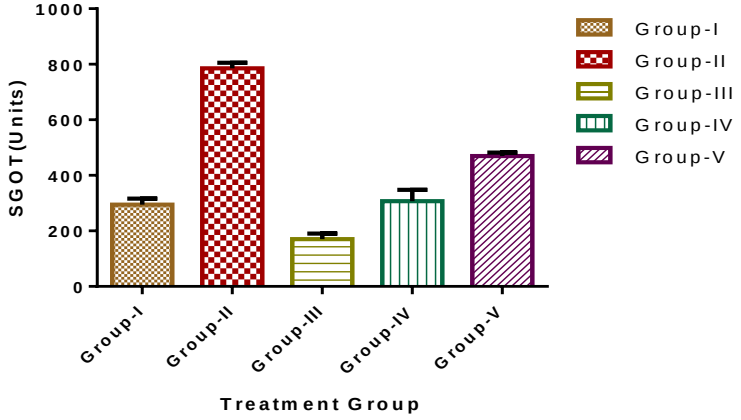


Figure 5: Effect of various treatments on SGOT.

Table 1(f): Effect of various treatments on SGPT.

Sl.No.	Parameters	Group-I	Group-II	Group-III	Group-IV	Group-V
6	SGPT (IU/L)	181.6±10.94	573.4±10.14	162±17.31	191±32.40	182.6±16.56

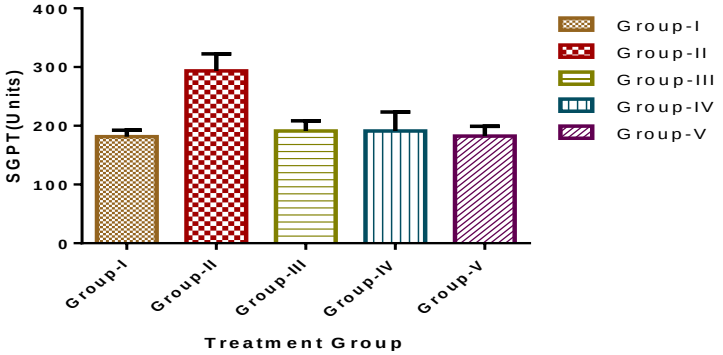


Figure 6: Effect of various treatments on SGPT.

Table 1(g): Effect of various treatments on ALP.

Sl.No.	Parameters	Group-I	Group-II	Group-III	Group-IV	Group-V
7	ALP(IU/L)	64.8±1.93	89±3.16	79.6±2.29	194±14.39	123±2.16

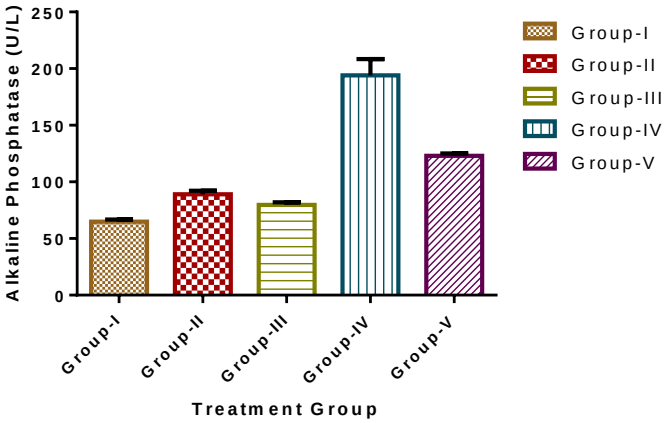
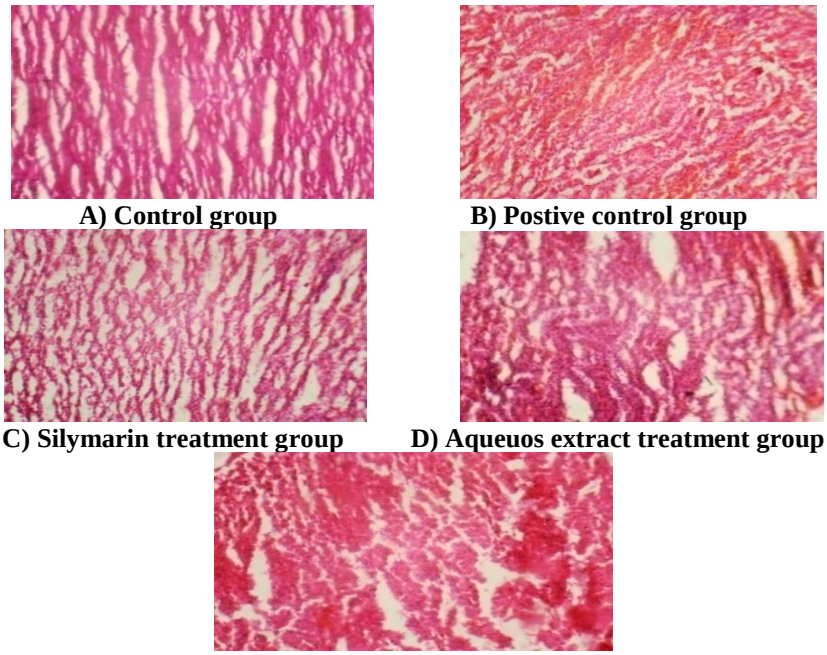


Figure 7: Effect of various treatments on ALP.

Table 2: Urine analysis parameters of various treatment groups.

Sl.No.	Parameters	Group-I	Group-II	Group-III	Group-IV	Group-V
1	Bile pigments	Negative	Negative	Negative	Negative	Negative
2	Bile salts	Negative	Negative	Negative	Negative	Negative
3	Ketone/ acetone bodies	Negative	Negative	Negative	Negative	Negative
4	Urobilinogen	Nil	Nil	Nil	Nil	Nil

Histopathological studies



A) Control group **B) Postive control group**

C) Silymarin treatment group **D) Aqueuos extract treatment group**

E) Methanol extract treatment group

Figure 8: Histology slides of the isolated liver of various treatment groups showing haematoxylin and eosin stained cells.

CONCLUSION

From the obtained results it may be concluded that Jatropha curcas methanolic extract exerted a significant effect against CCl4 induced hepatotoxicity in rats than Jatropha curcas aqueous extract ($p<0.001$) for most of the blood biochemical parameters, urine analysis as well in attenuation of liver fibrosis.

REFERENCES

1. Han DW. Intestinal endotoxemia as a pathogenetic mechanism in liver failure. World Journal of Gastroenterology, 2002 Dec. 1; 8(6): 961-5.
2. Gupta S, Singh SK, Girotra P. Targeting silymarin for improved hepatoprotective activity through chitosan nanoparticles. International Journal of Pharmaceutical Investigation, 2014 Oct.; 4(4): 156.
3. Patil D, Roy S, Dahake R, Rajopadhye S, Kothari S, Deshmukh R, Chowdhary A. Evaluation of *Jatropha*

curcas Linn. leaf extracts for its cytotoxicity and potential to inhibit hemagglutinin protein of influenza virus. Indian Journal of Virology., 2013 Sep. 1; 24(2): 220-6.
4. Dada EO, Ekundayo FO, Makanjuola OO. Antibacterial activities of *Jatropha curcas* (LINN) on coliforms isolated from surface waters in Akure, Nigeria. International journal of biomedical science., 2014 Mar.; 10(1): 25.
5. Oskoueian E, Abdullah N, Ahmad S, Saad WZ, Omar AR, Ho YW. Bioactive compounds and biological activities of *Jatropha curcas* L. kernel meal extract. International Journal of Molecular Sciences., 2011 Sep. 15; 12(9): 5955-70.
6. Dahake R, Roy S, Patil D, Rajopadhye S, Chowdhary A, Deshmukh RA. Potential Anti-HIV activity of *Jatropha curcas* Linn. leaf extracts. Journal of Antivirals & Antiretrovirals, 2014 Jan. 23; 2013.
7. Saetae D, Suntornsuk W. Antifungal activities of ethanolic extract from *Jatropha curcas* seed cake. Journal of Microbiology and Biotechnology, 2010 Feb.; 20(2): 319-24.
8. Shetty S, Udupa SL, Udupa AL, Vollala VR. Wound healing activities of Bark Extract of *Jatropha curcas* Linn in albino rats. Saudi Medical Journal, 2006; 27(10): 1473-6.
9. Mujumdar AM, Misar AV. Anti-inflammatory activity of *Jatropha curcas* roots in mice and rats. Journal of Ethnopharmacology, 2004 Jan. 31; 90(1): 11-5.
10. Sachdeva K, Garg P, Singhal M, Srivastava B. Pharmacological evaluation of *Jatropha curcas* L. extract for Anti-diarrhoeal Activity. Research in Pharmacy, 2015 Oct. 29; 2(2).
11. Alwi NA, Sukardi S. Anti implantation effects of *Jatropha curcas* crude oil when fed to pregnant Sprague dawley rats during the early gestation period. Advance Life science and Technology, 2013; 14: 547-9.
12. Osoniyi O, Onajobi F. Coagulant and anticoagulant activities in *Jatropha curcas* latex. Journal of Ethnopharmacology, 2003 Nov. 30; 89(1): 101-5.
13. Aghel N, Kalantari H, Rezazadeh S. Hepatoprotective effect of *Ficus carica* leaf extract on mice intoxicated with carbon tetrachloride. Iranian Journal of Pharmaceutical Research, 2010 Dec.; 13: 63-7.
14. Bachar SC, Mahmud ZA, Qais N. Antioxidant and hepatoprotective activities of ethanolic extracts of leaves of *Premna esculenta* Roxb. against carbon tetrachloride-induced liver damage in rats. Journal of Young Pharmacists, 2012 Dec. 31; 4(4): 228-34.