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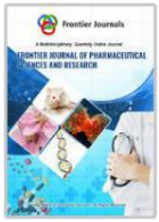

Original Research Paper

PHARMACOLOGICAL EVALUATION OF HEPATOPROTECTIVE ACTIVITY OF ROOT EXTRACT OF *ALBIZIA PROCERA* IN RATS

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ABSTRACT

A Phyto therapeutic approach to modern drug development can provide many invaluable drugs from traditional medicinal plants. Search for pure phytochemicals as drugs is time consuming and expensive. Numerous plants and polyherbal formulations are used for the treatment of liver diseases. However, in most of the severe cases, the treatments are not satisfactory. Although experimental evaluations were carried out on a good number of these plants and formulations, the studies were mostly incomplete and insufficient. The therapeutic values were tested against a few chemicals-induced subclinical levels of liver damages in rodents. Even common dietary antioxidants can provide such protection from liver damage caused by oxidative mechanisms of toxic chemicals. In the case of severe liver damage, most of the liver cells die or turn into fibrotic state. In this case, the treatment should include in addition to the therapeutic agents, agents which can stimulate liver cell proliferation. For developing satisfactory herbal combinations to treat severe liver diseases, plants have to be evaluated systematically for properties such as antiviral activity (Hepatitis B, Hepatitis C, etc), anti (antioxidants and others), stimulation of liver regeneration and choleretic activity. In the present study I taken *Albizia Procera* root extract for hepatoprotective activity.

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1. INTRODUCTION

Liver plays an important role in the detoxification and purification of blood from the digestive tract. It is a large, venous organ that makes it one of the largest reservoirs of blood in the body and can hold up to 1L of blood at a time. On the other hand, the internal surfaces of all hepatic sinusoids are covered by a high number of Kupffer cells that can phagocytize parasites, viruses, bacterial endotoxins and immunocomplexes.[1]

Liver disease is associated with the development of ALD, which is one of the leading causes of morbidity and mortality worldwide. The progression of ALD comprises of a spectrum of features including hepatic steatosis, inflammation, fibrosis, cirrhosis that may eventually lead to death. 40% of the patients develop end-stage liver disease with significant hepatic fibrosis and cirrhosis, and liver.[2]

The present work is established with the aim to evaluate the pharmacological effect of root extract of *Albizia procera* against paracetamol induced hepatocytes degeneration in Albino wistar rats.

2.PLANT PROFILE

Albizia procera commonly known as white siris is a fast growing species belonging to the family fabaeceae. The leaves of plant contain Alpha spinasterol, hentriacontane and hexacosanol, whereas seeds contain procerogenin A, Mechaerinic corrosive, Procericacids, Proceranin A, (hypotensive in creatures), Oleanolic corrosive. *Albizia procera is a*

protein-rich grain of *Albizia procera* is eaten by cows, wild oxen, goats, camels and elephants in South Asia and Philippines. The plant is utilized for stomach and intestinal illnesses. A decoction of the bark is given in ailment and discharge.

3. MATERIAL AND METHODS

The roots of *Albizia procera was* collected in Tirumala forests, Tirupati, A.P, India in the month of January 2019. The plant sample was further verified and authenticated by a registered botanist Dr. Madavachetty, the voucher specimen of the plant was deposited at the college for further reference. [5]

The powdered plant materials were placed in the thimble present in the central compartment, with a siphoning device side arm which was connected to the lower compartment. The solvent was placed in central and lower compartments. Then the solvent was heated to boiling. The dissolvable vapor, which was produced by delicately warming the store gets dense and was permitted to trickle once again into the permeable example cup. The fluid condensate that trickles onto the example plays out the extraction which at that point went through the compartment and once more into the supply. The cycle was rehashed consistently and can be continued insofar as required. As it advances, the species were moved in the supply.

The powdered plant material was exposed to the extraction procedure by half liquor and half of refined water (500 ml/100g of dried powder) for 18 hrs. The concentrate arrangements got were gathered independently and concentrated utilizing a rotational evaporator. The yield of the Hydroalcoholic concentrates was observed to be 2.5 % and 2.5 % (w/w) individually. The dried concentrates were put away in a hermetically sealed compartment and set in a fridge.

4. EXPERIMENTAL SETUP

Animals

Wistar albino rats of 90-120 g were used for the study. The animals were procured from CPCSEA approved animal house and housed in five groups. Each group contained six animals and maintained under standard conditions (27±2ºC, relative humidity 44 - 56% and light and dark cycles of 10 and 14 hours, respectively) and fed with standard rat diet and purified drinking water and libitum for 1 week before and during the experiments.

All experiments and protocols described in the present study were approved by the Institutional Animal Ethical Committee (IAEC) and adopted all rules framed by Committee for the purpose of Control and Supervision of Experiments (CPCSEA) on rodents.[5]

Experimental Design

Wistar rats were divided into five groups having six animals in each group (normal control, toxic control, standard, test low dose and test high dose).

Group I (Normal) - This group received normal saline (1ml/kg) for seven days.

Group II (Control) **-** This group received Paracetamol (2gm/kg) (p.o.)

Group III (Standard) This group received Silymarin 100 mg/kg (p.o.). once daily for seven days + Paracetamol (2gm/kg) (p.o.).

Group IV (Test- I) This group received *Albizia procera* Alcoholic root extract (300mg/kg,p.o.) + Paracetamol (2gm/kg) (p.o.).

Group V: (Test- II) This group received *Albizia procera* Aqueous root extract (300mg/kg,p.o.) + Paracetamol (2gm/kg) (p.o.) .

On the 7th day that is, after 48 h of pharmacological treatments, blood was withdrawn by retro orbital puncture for the estimation of biochemical parameters. After that, animals were sacrificed under ether anesthesia. The liver was collected, washed and used for histopathological studies.[6]

Histopathology of liver

Liver tissue from various groups were cut and dropped into a vial containing a fixative solution of neutral buffered 10% formaldehyde, and fixed for 24-48 h. Cuts were washed with running water, dehydrated in alcohol, and embedded in paraffin. Paraffin-embeddedliver tissue was cut into 4-6 µm thick sections and used for Hematoxylin and Eosin as well as Sirius Red staining.[7]

Statistical Analysis

Each result is presented as mean ± SEM (standard error of mean). Statistical analysis of the data were performed with one-way analysis of variance (ANOVA) followed by the Tukey post hoc comparison test. Dose dependent effects were evaluated using correlation coefficient. Significant differences were set at p- values lower than 0.05.[4]

5. RESULTS AND DISCUSSION

TABLE 1 Percentage Yield

S.No	Plant extract	Practical yield	Theoretical yield	Percentage yield
1.	Aqueous extract	24gm	45gm	50%W/W
2.	Ethanolic Extract	22gm	45 gm	38%W/W

TABLE 2 Pharmacognostical Parameters

Parameters: Loss on drying

S.No	Parameters	%W/W
1.	Loss on drying	0.30
1a.	% volatiles	22
1 b.	% solids	79

Parameters: Ash Values

S.No	Parameters	%W/W
a.	Total ash value	6.627
b.	Acid insoluble ash	0.844
c.	Water soluble ash	3.747

Extractive Values

S.No	Parameters	% W/W
a.	Water soluble extractive value	3.03
b.	Ethanol soluble extractive value	7.14
C.	Petroleum ether soluble extractive value	9.12
i.	Volatile	0.00297
ii.	Non volatile	0.069

Bio chemical Parameters

Hepatoprotective Effect of Root extract of *Albizia procera* on biochemical parameters in Pparacetamol induced hepato-toxicity in rats. Rodents treated with PCM built up a huge hepatic harm saw as raised serum levels of hepatic explicit chemicals like SGPT, SGOT and Albumin, Total protein and Creatinine when contrasted with typical control. Pre-treatment with Silymarin, hydro-alcoholic concentrate had demonstrated great security against paracetamol (PCM) actuated lethality to liver. Test demonstrates a critical decrease in raised serum chemical levels with concentrate treated creatures contrasted with dangerous control creatures which can be appeared in the table no- 4[10]

FIGURE 1 Effect of root extract of *Albizia procera* on SGOT levels in PCM induced Hepatotoxicity in rats

FIGURE 2 Effect of root extract of *Albizia procera* on SGPT levels in PCM induced Hepatotoxicity in rats

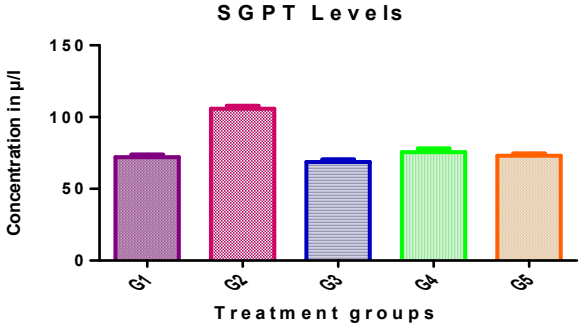


FIGURE 3 Effect of root extract of *Albizia procera* on TOTAL PROTEIN levels in PCM induced Hepatotoxicity in rats

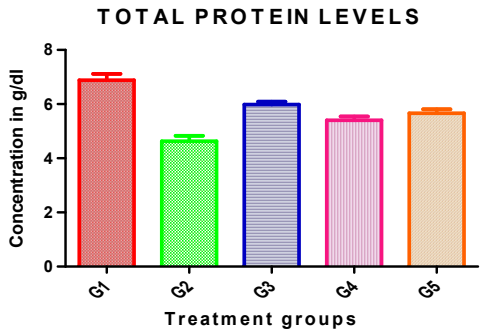


FIGURE 4 Effect of root extract of *Albizia procera* on ALBUMIN levels in PCM induced hepatotoxicity in rats:

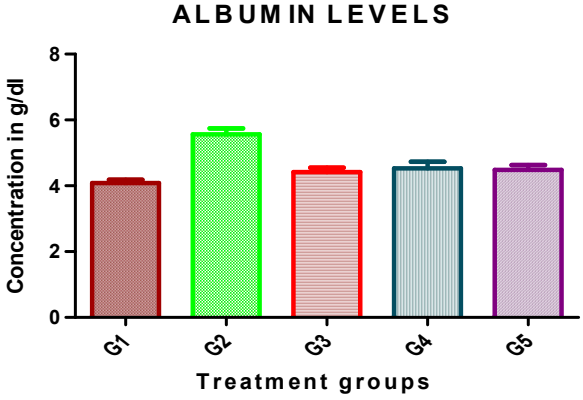


Figure 5 Effect of root extract of *Albizia procera* on CREATININE levels in PCM induced Hepatotoxicity in rats

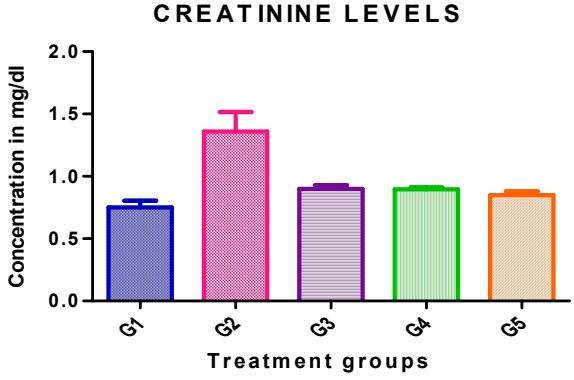
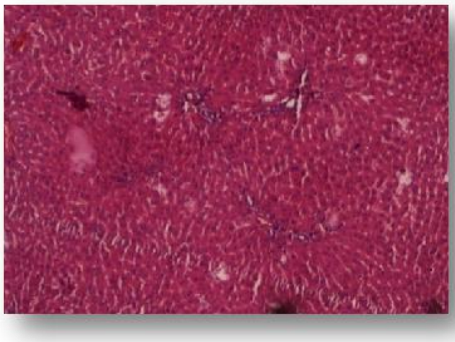


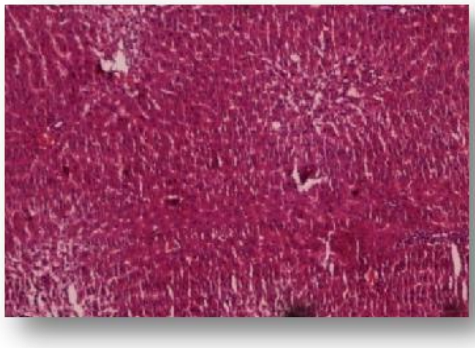
TABLE 3 Data showing the effect on Biochemical parameters

S.NO	GROUPS	SGOT µ/l	SGPT µ/l	TOTAL BILURUBIN	ALBUMIN g/dl	ALKALINE PHOSPHATASE	GLOBULIN g/dl	TOTAL PROTEIN mg/dl
1	Group I	**75.66±2.065**	**58.5±2.34**	**0.76±0.05**	**2.63±0.33**	**6.66±0.44**	**3.033±0.21**	**6.96±0.44**
2	Group II	**97.66±2.87**	**87.16±3.65**	**1.03±0.05**	**1.75±0.18**	**5.31±0.31**	**1.88±0.17**	**5.31±0.31**
3	Group III	**51.66±3.44**	**49±3.74**	**0.76±0.08**	**2.08±0.22**	**6.93±0.26**	**2.28±0.24**	**6.93±0.26**
4	Group IV	**76.16±4.70**	**82±1.788**	**0.83±0.08**	**2.36±0.216**	**6.41±0.07**	**2.66±0.19**	**6.41±0.07**
5	Group V	**67.83±6.04**	**58.33±3.77**	**0.71±0.12**	**2.13±0.23**	**6.08±0.23**	**2.13±0.44**	**6.08±0.23**

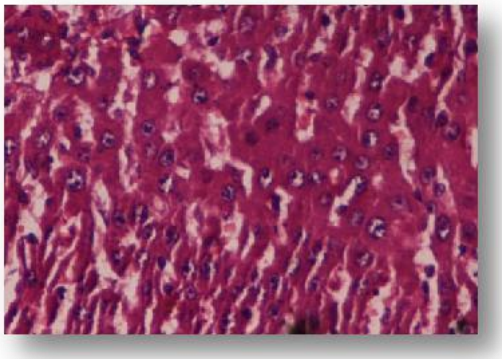
Histopathological Studies



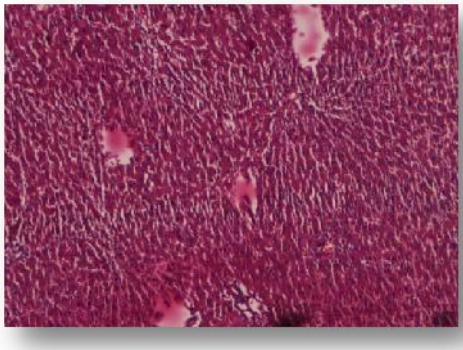
Normal: The architecture of hepatic cells showed normal. The central veins sinusoids and portal disappear normal. The hepatocytes show moderate cytoplasm and round to oval nuclei. There is no periportal inflammation.



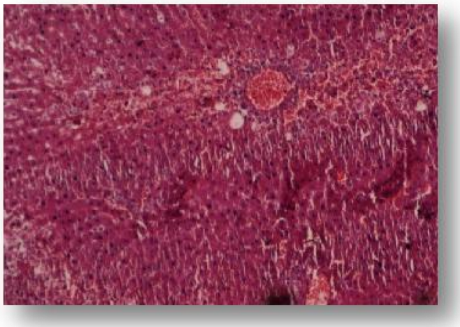
Silymarin(100 mg/kg): Hepatocytes have shown normal size with hepato portal vein.There is mild increase in fibrous connective tissues with minimal sign of hepatotoxicity. Regenerative activity of hepatocytes is looking maximum.



Paracetamol induced: The architecture is partly effaced. The central veins, sinusoids and portal triads appear congested. The hepatocytes show feathery degeneration and show moderate cytoplasm and round to oval nuclei. There is periportal inflammation.



Group-IV (300mg/kg each): Liver with mild sign of hepatotoxicity, tissue with typical lobular arrangement. Minimal centrilobular necrosis. The portaltriads show mild periportal inflammation composed of lymphocytes.



Group-V (300mg/kg each): The hepatocytes show moderate cytoplasm and moderately enlarged pleomorphic and hyper chromatic nuclei. The portal trade show mild peri portal inflammation composed of lymphocytes. The central veins are normal.

6. CONCLUSION

Liver can partake in an assortment of metabolic action by the nearness of no of proteins and they self-uncovered an excessive number of toxicants, drugs, synthetic concoctions which can harm it. In this Hepatoprotective examination paracetamol utilized as hepatotoxic operators to initiate liver harm, since it is utilized by person for non-medicinal purposes or by restorative purposes. Diverse Phytochemical have been found to secure a broad scope of exercises to ensure against interminable infections. Alkaloids have therapeutic uses from antiquated days as it has natural organic action of cytotoxicity and furthermore secure against constant illnesses. Flavonoids get a wide scope of helpful properties, for example, cancer prevention agents, antimicrobial, hostile to stiffness, against hypertensive and diuretic. Saponins are responsible for its calming, antitoxin, antimicrobial, anti fungal and furthermore have a job to ensure against hypercholesterolemia and anti-microbial exercises. The compound which resembles tannins and flavonoids are a noteworthy gathering of mixes which can be known with the expectation of complimentary radical scroungers. Since these mixes were found in the Roots of hydroalcoholic concentrate of *Albizia procera*, it may have the fit for compelling cancer prevention agent limit.[11]

Hepatoprotective action is performed against paracetamol-initiated hepatotoxicity in rodents. In hepatotoxicant gatherings, hepatotoxin gets changed over into radicals in liver by activity of compounds and these assaults the unsaturated fats of films in nearness of oxygen to give lipid peroxides subsequently. The practical uprightness of hepatic mitochondria is adjusted, prompting liver harm. [12]

Pretreatment with AEAP (200&400 mg/kg, p.o) and silymarin (100 mg/kg, p.o) displayed a capacity to check the hepatotoxicity by diminishing serum marker proteins.

In hepato toxicant gatherings, there was a critical increment in all out bilirubin and huge decrease in absolute protein content. Whereas, pre treatment with AEAP (300 mg/kg,p.o) and silymarin (100 mg/kg, p.o) caused noteworthy decrease in complete bilirubin and huge increment in all out protein.

In the present investigation, the concentrates fundamentally diminished the raised degrees of previously mentioned serum marker compounds and increment in the degrees of protein. Thus, now it is inferred that the concentrates possess hepato protective movement.

7.CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

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