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Hepatoprotective effect of the seed of *Cassia sophera*, linn. Var. Purpurea, roxb. against CCl_4 induced hepatic damage in albino rats

Bilal Ahmad[a*], N. A. Khan[b1], Ghufran Ahmad[b2], M. Inamuddin[c]

[a*] *Unani Expert, T. K. D. L., National Institute of Science Communication & Information Resources, New Delhi*
[b1] *Professor & Chairman, Dep't. Of Ilmul Advia, A. M. U. Aligarh, U. P. India*
[b2] *Department of Ilmul Advia, A. M. U. Aligarh, U. P. India*
[c] *Department of Botany, AL-FATEH University, Tripoli, Libya*
Correspondence: bilalmd73@yahoo.co.in

Abstract: A number of mono and poly herbal preparations are widely used in Unani system of medicine for the management of hepatic disorders. However, many of them have not been scientifically investigated for their described effects. *Cassia sophera*, Linn. var.purpurea, Roxb. (Kasondi) is one such drug reported to be hepatoprotective. Therefore, in the present study ethanol extract of seed was investigated for hepatoprotective activity against carbon tetrachloride induced hepatotoxicity. Kasondi seed was administered along with CCl_4 (1.0ml/kg) and elevation of marker enzymes of liver function was taken as the index of hepatotoxicity. Alcoholic extract of seed in the dose of 440mg/kg body weight observed to significantly protect against CCl_4 induced hepatotoxicity.

Key words: Cassia sophera, Hepatotoxicity, Hepatoprotective, Unani Medicine.

Introduction

Tibb-e-Unani (Unani Medicine) claims to possess many safe and effective drugs, useful in various hepatic disorders but many of them, despite being widely used in the management of hepatic ailments have not been scientifically studied for their pharmacological effects. Kasondi is one such drug, which was included in Unani materia medica by physicians of India (1). Kasondi is a name shared by three plants viz., *Cassia occidentalis*, Linn., *Cassia sophera*, Linn., and *Cassia sophera* Linn., var. purpurea, Roxb., which are considered as the varieties of Kasondi and used invariably in similar pathological conditions by physicians of Unani System (2-4). *Cassia sophera*, Linn., var. purpurea, Roxb. belongs to family Caesalpiniaceae and is described in Unani literature to be blood purifier, resolvent, calorific, purgative, carminative, digestive, repulsive of corrupt humours, diaphoretic (2-5) and is useful in ascites, dyscrasia of liver, anaemia, skin disorders, piles and jaundice (2-4).

In ethno botanical literature it is reported to be effective in diabetes, asthma, cough, acute bronchitis, pityriasis, psoriasis and expulsion of corrupt humours (6-11).

Scientific studies have revealed that *Cassia occidentalis*, Linn. is a very effective antihepatotoxic agent (12-13), but no scientific study is reported regarding the hepatoprotective activity of *Cassia sophera*, Linn., var. purpurea, Roxb. Therefore, in the present study its seeds were investigated for their hepatoprotective activity against CCl_4 induced hepatotoxicity in rats while the leaves of this plant were found to possess hepatoprotective effect in our study (14).

Materials and Methods

The seeds of the plant used in this study were collected from the herbal garden of Department of Ilmul Advia, Aligarh Muslim University (A.M.U.), Aligarh. The drug was identified by Prof. Wazahat Hussain, Department of Botany, A.M.U., Aligarh. The voucher specimen has been deposited in the museum of the department of Ilmul Advia, A. M. U., Aligarh.

The seeds were powdered by grinding and extracted with 70% alcohol in a Soxhlet apparatus for six hours, solvent was evaporated by heating on water bath. The extract was dissolved in distilled water and used for the experiment in a dose of 440mg/kg. The dose of the test drug was calculated for animals by multiplying the Unani clinical dose by conversion factor of seven (15). Since the exact dose of every part of Kasondi is not mentioned in Unani books, it was considered suitable to test the drug on conventional clinical dose of 10gm calculated on the basis of temperament of drug. However, when the calculated dose did not produce any significant effect in experimental animals in the preliminary screening, the dose was doubled. Wistar albino rats of either sex weighing 150-200gm were procured from animal house of Department of Ilmul Advia, A. M. U., Aligarh. They were fed on commercial diet and tap water *ad libitum* during the experiment. The experiments were approved by the Institutional Animal Ethical Committee of A.M.U.

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Experimental design:

The rats were divided into two groups (n = 6). Group I, which served as control group was given distilled water orally for five days. Group II, serving test group was treated with ethanol extract of Kasondi seed (440mg/kg) orally, for the same period. On the fifth day animals in all groups were administered carbon tetrachloride in the dose of 1.0ml/kg by subcutaneous injection, 30 minutes after the drug/vehicle treatment. On the 6th day all the rats were anaesthetized with anaesthetic ether and decapitated. Blood was collected and various biochemical parameters like SGOT, SGPT, Serum bilirubin (total) and Serum alkaline phosphatase were estimated (16-18) using commercial kit of Span Diagnostics (India) Pvt. Ltd. Students 't' test was applied to analyze the results.

Results and Discussion

The capacity of a drug to reduce the harmful effect or maintain the normal physiology of liver, which have been disturbed by a hepatotoxic agent is indicative of its hepatoprotective effect. Carbon tetrachloride, used in our study is a widely used chemical substance to induce hepatic injury in animals. In the system CCl_4 is converted to CCl_3, which is a very reactive radical, resulting in oxidation of the polyenoic fatty acids present within the membrane phospholipids (19). The enzymes leak out of the hepatocytes into blood because the membrane is damaged due to radical nature of CCl_3, which oxidizes the membrane lipids in addition to inducing DNA damage and inducing apoptosis of the hepatocytes (20).

Since the elevation of marker enzymes of liver function is an indication of liver damage as these enzymes released from hepatocytes and enter into the blood following the death or loss of integrity of hepatocytes (22), a significant decrease in the level of elevated enzymes in the rats from the treated group was observed (Table 1), which is suggestive of probable protection of structural integrity of hepatocyte membrane or regeneration of damaged liver cells by the ethanol extract of Kasondi seed (Table 1).

The other important and interesting information demonstrated by our study is that the Kasondi seed, which is not used as heptoprotective agent by Unani physicians, also possess heptoprotective effect. This will increase the spectrum of its therapeutic application greatly as both parts viz., leaf and seed of the plant would be used for almost equal degree of hepatoprotective effect and can be used also as a good substitute for each other.

TABLE-1 Effect of Alcoholic Extract of Seed of Cassia sophera, Linn. var. purpurea, Roxb. on marker enzymes of liver function in rats subjected to CCl_4 induced hepatotoxicity

Groups	S G P T (U/ml)	S G OT (U/ml)	S. Bilirubin (mg/dl) Total	Serum Alkaline Phosphatase (K A Units)
Control (Vehicle + CCl_4)	170.2±3.954	182.7±2.0	1.58±0.183	31.3±0.862
Alcoholic Extract (440mg / kg) + CCl_4	155±2.127*	165.8±1.612**	0.916±0.140*	27.9±0.350*

n = 6 (albino rats) Values Mean ±SEM ; *= p < 0.05 , **=p< 0.001

Conclusion

It can be concluded that the test drug although, showed significant hepatoprotective effect in Kasondi treated rats as compared to control group but the level of marker enzymes of liver function (SGOT, SGPT) in the test group was found still high and did not reduce to normal physiological level indicating marginal effect of the ethanol extract of Kasondi seed. Further studies may be carried out to evaluate the hepatoprotective effect of test drug using higher dosage levels.

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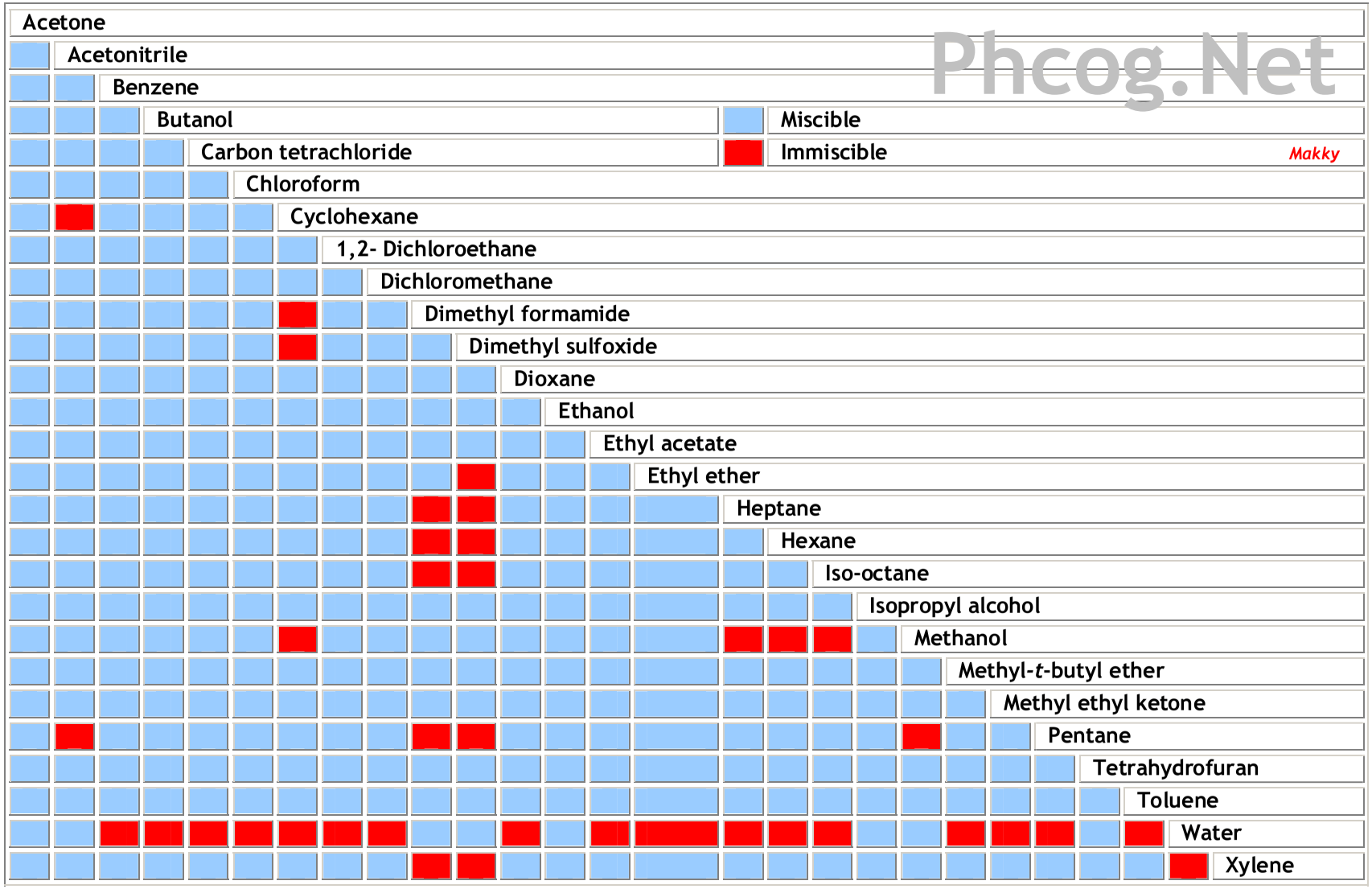

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