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Prophylactic activity of Kashni against hepatocellular injury induced in albino mice

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ABSTRACT

Herbal drugs have gained importance in recent years because of their efficacy and cost effectiveness. Kashni (*Cichorium intybus* Linn., commonly known as Chicory) is one such herb which is used in Indian medicine as tonic. It is said to be useful in fevers, vomiting, diarrhoea and enlargement of spleen. Its root is used as stomachic and diuretic. It has been reported to be useful in jaundice, liver enlargement, gout and rheumatism. Roots are used as blood purifier, emmenagogue and in asthma. Its seeds have been reported to be carminative, agglutinating and cholagogue. In the present study, 50% ethanolic extract of whole plant of Kashni, at three dose levels (50,100 and 200mg/kg), was evaluated for prophylactic activity against paracetamol induced hepatocellular damage in albino mice. Extract of the herb, when administered prophylactically, was found to reduce the serum alanine transaminase (ALT) levels in a dose dependent manner while the dose of 200mg/kg/day of Kashni resulted in highly significant fall in the serum ALT levels. These results were confirmed by histopathological studies which revealed marked regenerative activity at three doses of the extract. © 2008 Trade Science Inc. - INDIA

KEYWORDS

Kashni;
Paracetamol;
Hepatocellular injury;
Prophylactic activity;
Cichorium intybus;
Anti-hepatotoxic.

INTRODUCTION

Kashni (*Cichorium intybus* Linn.) belongs to the family Asteraceae (Compositae) and is distributed in Europe, the Mediteranean region and Northern Asia. In India, it is found wild in Punjab, Andhra Pradesh and Kashmir. It is an erect perennial herb, 30-90cm in height with a fleshy taproot upto 75 cm in length.

The main constituents of Kashni reported to be present in root are inulin, reducing sugars and sucrose[1]. Sesquiterpene lactones such as Cichorides A, B and C Guanine type sesquiterpene lactones such as 8-deoxy, lactucopicrin; crepidiaside B and 11 and beta, 13-dihydrolactucin, two known germacrene type sesquiterpene glycoside-Picriside B and Sonchuside A- and Eudesmane type sesquiterpene glycoside Sonchuside C stand reported[2].

In the traditional system of medicine, various uses have been attributed to Kashni. Bruised fresh leaves are applied externally for healing eye inflammations and boiled in broth for strengthening the digestion[3]. Extracts of different varieties have been reported to show some promise to treat diseases characterised by tachycardia, arrhythmia and fibrillation[4]. Both alcoholic and aqueous extracts potentiated pentobarbitone and ethanol induced hypnosis in mice, exhibited analgesia and potentiated morphine analgesia in rats[5]. Root extract has shown anti-inflammatory and hepatoprotective activities[6,7]. The present study was undertaken to study any prophylactic potential of ethanolic extract of whole plant of Kashni at three dose levels (50,100 and 200 mg/kg/day) against liver damage induced in albino mice.

MATERIALS AND METHODS

Whole plant of Kashni was collected from Kashmir University Campus. It was identified by plant taxonomist, Dr.A.R.Naqshi, Department of Botany, faculty of Science, University of Kashmir. A voucher specimen is deposited in the Department of Botany, University of Kashmir under No.02-06-03/1002(KASH). The material was freed from extraneous matter, dried in a well-ventilated room, the outside temperature being in the range of 18-32^{0}C. It was then coarsely powdered and 50% ethanolic extract was prepared as described in I.P (1985)[8]. The combined filtrate obtained was distilled under vacuum, the temperature of distillation being in the range of 33 to 44^{0}C and extract was evaporated to dryness in air to obtain a solid mass.

Albino mice of Wistar strain, weighing between 16-23g, were procured from Central Animal House, RRL, Jammu after proper approval. They were housed under uniform animal husbandry conditions in polypropylene cages, fed with proper diet and water ad-libitum. They were exposed to 12hr.light-dark cycle and the relative humidity was in the range of 61-76%.

Mice were divided into five groups of six animals each. Group 1 served as vehicle control, Group 3, 4 and 5 received 50% ethanolic extract of whole plant of Kashni at the dose of 50mg, 100mg and 200mg/100g/day respectively, daily for five days in single oral dose. After five days i.e on day 6th, Groups 2, 3 and 4 were adminiistered the hepatotoxic agent, paracetamol solution (500mg/kg body weight), in a single oral dose[9]. The mice of Group 1 received only 1% gum acacia suspension in distilled water daily for six days. After overnight fasting, on day 7th, blood was withdrawn from the retino-bulbar venous plexus of all the Groups 1- 5. Serum was separated and estimated for ALT levels[10]. Livers were dissected out from mice and after weighing, were preserved in 10% formalin for histopathological studies. Mice were weighed on every alternate day during the study.

All the procedures were performed in accordance with the Institutional Animal and Ethics Committee (IAEC) at the Department of Pharmaceutical Sciences, University of Kashmir.

TABLE 1 : Effect of different doses of 50% ethanolic extract of Kashni (*Cichorium intybus)* on ALT levels when given prophylactically, against paracetamol induced acute hepatocellular damage in mice

Group	Treatment	Serum ALT levels (IU/L)	Stastistically compared groups
1	Control (1% gum acacia)	44.78±2.50 (n=6)	
2	Only Paracetamol (500mg/kg, orally, in single dose)	117.40±12.16*** (n=5)	2 Vs 1
3	Kashni extract (50mg/ kg/day)+Paracetamol	95.20±7.86* (n=5)	3 Vs 2
4	Kashni extract (100mg/ kg/day) +Paracetamol	78.75±7.82** (n=5)	4 Vs 2
5	Kashni extract(200mg/ kg/day)+Paracetamol	54.01±1.74*** (n=5)	5 Vs 2

***p>0.05, **p<0.05, ***p<0.001; Data shown are mean ± S.E.M; Number of animals in each group are given in parenthesis. Stastistical significance calculated by ANOVA, using student 't' test. All comparisons are made with Group 1 and 2.**

Statistical analysis

Values are expressed as mean ± SE from the number of replications described in the test. Total variation present in a set of data has been estimated by ANOVA. The t-value was also calculated for two-sided test. P< 0.05* considered significant and p< 0.01** as highly significant.

RESULT

The yield of extract of Kashni whole plant was 14.49% w/w. A highly significant rise (***p<0.001) in ALT levels (117.40±12.16 IU/L) was observed in mice of Group 2, which received single dose of paracetamol as compared to mice of Group 1. 50% ethanolic extract of Kashni produced a fall in ALT levels (Group 3) at the dose of 50 mg/kg/day while a significant (*P<0.05) and highly significant (***P<0.001) fall in Group 4 and Group 5, respectively, was observed at the dose of 100 and 200 mg/kg/day of Kashni extract when compared with only paracetamol treated mice (Group 2) (TABLE 1). The average liver weight of mice, after administration of 50,100 and 200 mg/kg/day of the extract prophylactically, for five days before giving a single dose of paracetamol, did not show any significant change as compared to the mice that had received single dose of paracetamol only.

Histopathology of livers of mice of Group 2 revealed marked centrilobular necrosis (Figure 1) while focal necrosis and mild sinusoidal congestion was observed in 33% livers at the dose of 50mg/kg/day. Mild regenerative activity was observed in 66% livers. At

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the dose of 100mg/kg/day, anisonucleosis and regenerative activity was observed in 90% livers (Figure 2). When administered at the dose of 200mg/kg/day, extract revealed regenerative activity in the hepatocytes. All the livers were almost normal (Figure 3).

DISCUSSION AND CONCLUSION

Liver diseases appear to be on increase in our society. Herbal drugs have gained importance in recent years because of their efficacy and cost effectiveness[11]. Numerous plant and polyherbal formulations are claimed to have hepatoprotective activities. However, only a small portion of such plants stand pharmacologically evaluated for their efficacy. Kashni has been advocated for various disorders in the folklore medicine and by Unani practioners. Hepatocellular damage can be caused by number of models. Paracetamol is a widely used antipyretic and analgesic that seems safe when taken in therapeutic doses but larger amounts may cause fatal hepatic necrosis[12]. Present study was conducted to find the prophylactic activity of 50% ethanolic extract of Kashni (*Cichorium intybus)* against paracetamol induced hepatotoxicity and paracetamol was used as the acute hepatotoxic model.

A highly significant rise ($p<0.001$***) in ALT levels was observed in the mice that had received a single dose of paracetamol only. Extract of Kashni, when administered in different doses prophylactically for five days before the administration of paracetamol, produced a dose dependent fall in enzyme levels, the decrease being highly significant at the dose of 200mg/kg of the extract. Histopathological studies revealed marked regenerative activity in the livers at the three doses of the extract. It can be concluded that Kashni possesses significant prophylactic antihepatotoxic activity against paracetamol induced acute hepatic damage. The extract is being studied against other hepatotoxin to establish its curative role against this model.

Histopathology in Mice Livers

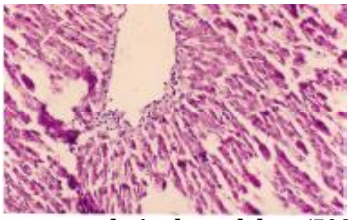

Figure 1: Paracetamol, single oral dose (500mg/kg body weight), centrilobular necrosis

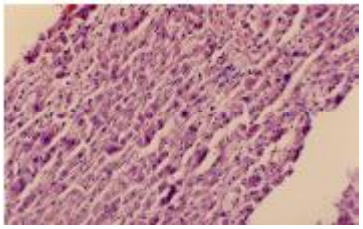

Figure 2: Kashni(100mg/kg/day) for 5days, prophylactically + Paracetamol (500mg/kg, b.w) single dose. Spotty necrosis, sinusoidal congestion, anisonucleosis, regenerative activity (H and E × 200)

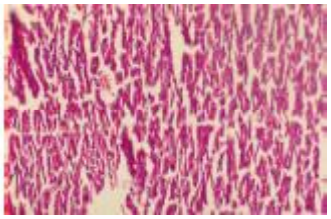

Figure 3: Kashni extract (200mg/kg/day) for 5days, prophylactically + Paracetamol single dose (500mg/kg b.w). Normal liver. (H and E ×200)

REFERENCES

[1] W.A.Wight, J.V.Niekerk; J.Agri.Food Chem.,**31**, 282-285 **(1983)**.

[2] M.Seto, T.Miyase, K.Umehara, Y.Hirano, N.Otani; Chem.Pharm.Bull., **36(7)**, 2423-2429 **(1998)**.

[3] A.Y.Leung, S.Foster; 'Encyclopaedia of Common Natural IngredientsUsed in Food, Drugs and Cosmetics', 2nd Ed., John Wiley; New York, 205-206 **(1996)**.

[4] S.T.Balbaa, A.Y.Zaki, A.Wahab; Planta Medica, **24(2)**, 133-44 **(1973)**.

[5] M.N.Jindal, V.K.Patel, V.B.Patel; Ind.J.Pharmacol., **7(3)**, 24-30 **(1975)**.

[6] R.Zafar, S.M.Ali; Hamdard Medicus., **41(4)**, 98-109 **(1998)**.

[7] C.G.Ki, D.S.Yim, S.Y.Lee; Nat.Prod.Sciences, **5(4)**, 155-158 **(1999)**.

[8] 'Pharmacopoeia of India; CSIR Publication', 3rd edition, Delhi, Part II. **A-74**, 75 **(1985)**.

[9] G.Pandey, D.N.Shrivastava.; Ind.J.Pharmacol., **22**, 1-12 **(1990)**

[10] S.Reitman and S.Frankel; Am.J.Clin.Path., **28**, 56 **(1957)**.

[11] A.Subramonium, P.Pushphagandan; Ind.J. Pharmacol., **31**, 166-175 **(1999)**.

[12] L.F.Prescott, N.P.Wright; Roscoe, S.S Brown; Lancet, **1**, 519-22 **(1971)**.