PROTECTIVE PROPERTY OF CICHORIUM INTYBUS IN CCl₄ INDUCED LIVER DAMAGE IN MICE

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- Abstract

**Background**: Medicinal plants play an important role in pharmaceutical preparations and medicine. *Cichorium intybus* has its own value in traditional therapy.

**Objective**: In this study we tried to find out the most effective dose and suitable time of administration for optimum results.

**Methods**: Doses of 25 mg/kg, 50 mg/kg, 75 mg/kg, 100 mg/kg, 125 mg/kg and 150 mg/kg were administered orally to the test group. The positive control group also received CCl₄ and the negative control group received normal saline. In this investigation serum enzyme activities such as ALT and AST were measured and the histopathological examinations were also studied.

**Results**: The maximum effective dose was 75 mg/kg. Histopathological findings and enzyme levels showed that the best protective effect was seen when given within 30 minutes after CCl₄ toxicity.

**Conclusion**: In mice, liver protection was observed at various doses of *Cichorium intybus* but optimum protection was seen with a dose of 75 mg/kg given 30 minutes after CCl₄ intoxication.

**Keywords**: *Cichorium intybus*, CCl₄, liver protection

**Introduction**

Liver injury induced by viruses, chemicals and drugs have been well recognized as a toxicological problem. The exact mechanism of hepatotoxicity is unclear, most probably resulting from a toxic intermediary that binds covalently to hepatocytes and causes a centrilobular hepatic necrosis. Alternate explanations of necrosis are lipid peroxidation and oxidation of thiol groups.

Many efforts have been made to find an antidote for liver toxicity, especially from natural sources (medicinal plants). Recently Liu et al. have extracted some hepatoprotective compounds from medicinal plants which have been used traditionally for liver disorders. Our previous investigation indicated that the crude extract of *Cichorium intybus* had a liver protective effect.

*Cichorium intybus*, also known as chicory, common chicory, succory and wild succory, is a wild plant from the class, Dicotyledones, family Compositae and genus Cichorium and grows in many parts of the world. In Iran it is known as "Kasni" and is found mainly in the Northern, North-Eastern and Southern provinces.

**Materials and Methods**

**Materials**

The plants were collected from the local market and identified scientifically as *Cichorium intybus* from the Compositae family. A number of Albino Swiss white male mice were supplied by Razi Research Center in Hesarak, Karaj, Iran. The animals were kept under proper light and diet control.
Carbon tetrachloride, formaldehyde and sodium hydroxide were purchased from Merck (Germany). Alanine Transaminase (ALT) and Aspartate Transaminase were obtained from Zist Shimoi Co, Iran. Other devices used were, Beckman’s centrifuge (USA), Microtum model 2045 (Germany), Sakura tissue passage model RH 12EP-2 (Japan). Busch spectrophotometer (Germany), Nikon light microscope (Japan) and Heidolph vacuum evaporator (Germany).

Methods

The hydroalcoholic extraction of *Cichorium intybus* was carried out with a ratio of 7: 3V/V under reflux for 3hrs and then concentrated to dryness under vacuum.

From the concentrated crude extract of the plant, doses of 25 mg/kg, 50 mg/kg, 75 mg/kg, 100 mg/kg, 125 mg/kg and 150 mg/kg were administered orally to the mice (test group).

Each group consisted of 7 mice (20±2 g). The positive control group received Carbon tetrachloride (*CCl₄*) and the negative control group received saline.

*T-test* was used to compare the means between the saline and poisoned groups. ANOVA was done to compare the effect of different doses of *C. intybus* with that of the control group.

In this investigation, we tried to find out at what dose and when the most protective effect is obtained. The time schedule we applied, was 30, 60 and 120 minutes after *CCl₄* intoxication in mice. The experiments were carried out for a period of 5 days and on the fifth day, blood was collected from the jugular vein for the measurement of liver enzymes. The liver was removed from each animal, weighed and the macroscopic appearances were noted down.

The representative slices of the livers were fixed in 10% neutral buffered formaldehyde for histopathological study according to Pauline et al.⁴

Results and Discussion

It is clear that carbon tetrachloride causes elevation in ALT and AST and also leads to liver necrosis and fatty liver⁵.

*Solanum alatum* is a medicinal plant, which could protect the liver from chemical injury.⁶ In this regard, we tried to investigate the liver protective effects of crude *Cichorium intybus* extract which has been used in traditional medicine for liver disorders⁷.

*Cichorium intybus* extract was employed at the above mentioned doses. The optimum protective effect was observed at a dose of 75 mg/kg and ALT and AST activities had significantly decreased as compared to the positive control group (Fig 1). This observation can relate to previous works as a point of protective effect⁸.

The histopathological observations also showed that hepatocyte regeneration increased significantly at the dose of 75 mg/kg as compared with the positive control group.

Liver protection was also observed at other doses of *Cichorium intybus*, but not as significantly as the dose of 75 mg/kg given after 30 minutes of *CCl₄* toxicity (Fig. 2).

Thus the results obtained in this study can be related to the works reported by Sherlac⁸.
In this investigation, it was seen that the histopathological findings did not show fat necrosis and the structure, shape and size of the liver returned to normal after CCl₄ intoxication.

It therefore seems that *Cichorium intybus* extract is suitable for the protection of liver damage caused by CCl₄ in mice.

References