

HEPATO-PROTECTIVE ACTIVITY OF THE ETHYL ACETATE EXTRACT OF *LAUNAEA INTYBACEA (JACQ) BEAUV* IN PARACETAMOL INDUCED HEPATO-TOXICITY IN ALBINO RATS

S. B. Takate^{1*}, R.D. Pokharkar¹, V.V.Chopade², V. N. Gite¹

1. Agasti Arts, Comers & Dadasaheb Rupwate Science College, Akole, Dist-Ahmednagar, 422601(MH) India.

2. Modern College of Pharmacy, Nigdi, Pune-411 044.

*Email: sbtakate@rediffmail.com

ABSTRACT

The present study was conducted to evaluate the hepato-protective activity of ethyl acetate extract of aerial parts of *launaea intybacea* are evaluated in paracetamol-induced hepatotoxicity in albino rats. Silymarin (200mg/kg) was given as reference standard. The ethyl acetate extract of aerial parts of *launaea intybacea* have shown very significant hepatoprotection against paracetamol-induced hepatotoxicity in albino rats in reducing serum total bilirubin, SALP, SGPT, SGOT levels and liver homogenates LPO, SOD, CAT, GPX, GST and GSH levels.

Key words: *Launaea intybacea*, hepatotoxicity, Paracetamol and silymarin.

INTRODUCTION

A number of medicinal plants are used in traditional system of medicine for the management of liver disorders. However many of them have not investigated for their described effects. *Launaea Intybacea* is one such medicinal plant used in the treatment of liver disorders in folk medicine. The present study was conducted to evaluate the hepatoprotective activity of *Launaea Intybacea* plant powder ethyl acetate extract against liver disorders induced by Paracetamol in wistar albino rats. The extract of plant powder was administered orally to the animals. Various biochemical parameters were studied to evaluate the hepatoprotective activity of ethyl acetate extract. Serum bilirubin, serum alkaline phosphate, serum glutamic oxaloacetic transaminase and serum glutamate pyruvate transaminase and liver homogenate superoxide dismutase, catalase, glutathione peroxidase, lipid peroxidation, glutathione-reduced and glutathione-transferase were determined to assess the effect of the various extract the Paracetamol induced liver disorders. The study revealed that ethyl acetate extract significantly reduced serum bilirubin, SGOT, SGPT and SALP levels and liver homogenates LPO, SOD, CAT, GPX, GST and GSH levels. The present findings suggest that the plant *launaea intybacea* possess potential hepatoprotective activity. The alkaloids, saponins, tannins and phenolic compounds are responsible for the hepatoprotective activity. The present study scientifically validated the traditional use of *Launaea intybacea* for liver disorders.

MATERIALS AND METHODS

Plant material

The plant material used in this study was collected during month of Oct-Nov, in Akole Dist-Ahmednagar (MH), India and authenticated from Department of Botanical Survey of India, Pune (India).

Preparation of the Extracts

The shade dried aerial part of *Launaea intybacea* was extracted with ethyl acetate successively by soxhlation method. The extract was filtered, evaporated to dryness (40°C). The yield of extract was calculated.

Animals

Albino rats (either sex) of Sprague dawley strain, weighing 150-200g were used. The animals were acclimatized to laboratory conditions (RT-25°C) for 4 days and given pelleted animal feed (Hindustan Lever) and drinking water, Diagnostic reagent kits (Enzopak) were used for the estimation of serum SALP, SGPT and SGOT levels (Handa, 1986, *et al*) and assay procedure was used for the estimation of liver homogenates LPO, SOD, CAT, GPX, GST and GSH.

Toxicity studies

Acute toxicity study was performed for ethyl acetate extract according to the acute toxic classic method as per OECD guidelines, (Ashok, 2001, *et al*) albino rats were used for acute toxicity study. The animals were kept fasting for overnight providing only water, after which the extract was administered orally at the dose of 100, 200 and 400 mg/kg and observed for 16 days. If mortality was observed in 2 out of 3 animals, then the dose administered was assigned as toxic dose. If the mortality was observed in 1 animal, then the same dose was repeated again to confirm the toxic dose. If mortality was not observed, the procedure was repeated for further higher dose i.e., 400 mg/kg.

Hepatoprotective Activity

The animals were divided into four groups comprising of six albino rats in each group using randomization technique and treated with the extract for sixteen days to assess the hepato-protective potential of the plant. The first group (vehicle control) received vehicle for all the days. The second group was kept as toxin control and given only the Paracetamol treatment. The third group received ethyl

acetate extract in the dose of 200mg/kg p.o. and the forth group received the Silymarin in the dose of 200mg/kg p.o. as a reference material for the study. All the animals except the vehicle control received Paracetamol all 16th day of the treatment. The animals were sacrificed by cervical dislocation after 48 hours of Paracetamol administration. The blood samples were collected by cardiac puncture in heparinized microfuge tubes. The blood samples thus collected were immediately centrifuged at 2200rpm for 15 minutes. When serum clearly separated out, the serum was analyzed for SGPT, SGOT and SALP levels using enzopak reagent kits by the method proposed by Reitman and Frankel. The results thus

obtained were subjected to statistical analysis using *student t-test* and analysis of variance (Ashok 1999 and Heba 2006, *et al*) The livers were dissected out immediately, washed with ice cold saline and 10% homogenates in 1.15% (w/v) KCl were prepared. The homogenates were centrifuged at 7000rpm for 10 min at 4°C and the supernatants were used for the assays of LPO, SOD, CAT, GPX, GST and GSH. The results thus obtained were subjected to statistical analysis using *student t-test* and analysis of variance (Ashok 1999 and Heba 2006, *et al*).

Table 1: Effect of ethyl acetate extract of *Launaea intybacea* aerial parts on Paracetamol-induced hepatotoxicity (Serum parameters).

S. No.	Groups	Total Bilirubin ^a (mg/dl)	SALP (Units/ml) ^a	SGPT (Units/ml) ^a	SGOT (Units/ml) ^a
1.	Control (propylene glycol) 1 ml	0.85 ± 0.08	228.1 ± 2.43	81.3 ± 1.58	194.32 ± 1.23
2.	Paracetamol (1000mg/kg)	2.02 ± 0.21	335.22 ± 21.10	210.12 ± 14.04	352.12 ± 21.23
3.	Ethyl acetate Extract (200mg/kg)	0.82 ± 0.04	226.3 ± 2.22	82.4 ± 2.11	193.12 ± 1.00
4.	Silymarin (200mg/kg)	0.85 ± 0.03	228.65 ± 22.09	81.53 ± 26.26	194.38 ± 1.35

^a Values of mean ± S.E.M. (n=6)

Table 2: Effect of ethyl acetate extract of *Launaea intybacea* aerial parts on Paracetamol-induced hepatotoxicity (Liver homogenates)

S. No	Groups	LPO (nmoles/mg of protein)	SOD (Units/mg of protein)	CAT (Units/mg of protein)	GPX (µg/mg)	GST (µg/mg of protein)	GSH (µg/mg of protein)
1	Control Propylene glycol (1 ml)	0.41 ± 0.09	106.1 ± 6.2	21.40 ± 1.3	3.0 ± 0.01	1.22 ± 0.11	0.31 ± 0.03
2	Paracetamol (1000mg/kg)	1.33 ± 0.02	36.17 ± 1.40	6.00 ± 0.33	0.9 ± 0.06	0.49 ± 0.02	0.12 ± 0.05
3	Ethyl acetate extract (200mg/kg)	0.43 ± 0.77	105.52 ± 1.21	21.34 ± 1.31	3.12 ± 0.02	1.25 ± 0.06	0.32 ± 0.01
4	Silymarin (200mg/kg)	0.41 ± 0.01	106.33 ± 1.75	21.35 ± 1.1	3.16 ± 0.03	1.21 ± 0.31	0.32 ± 0.01

^a Values of mean ± S.E.M. (n=6)

RESULTS AND DISCUSSION

The present studies were performed to assess the hepatoprotective activity in rats against Paracetamol as hepatotoxin to prove its claims in folklore practice against liver disorders. Paracetamol-induced hepatic injury is commonly used as an experimental method for the study of hepatoprotective effects of medicinal plants extracts and drugs.

The extent of hepatic damage is assessed by histological evaluation and the level of various biochemical parameters in circulation. Highly reactive trichloro free radical formation, which attacks polyunsaturated fatty acids of the endoplasmic reticulum, is responsible for the hepatotoxicity of Paracetamol. It produces hepatotoxicity by altering liver microsomal membranes in experimental animals. From the Table 1 it was evident that extract was able to reduce all the elevated biochemical parameters due to the hepatotoxin intoxication. The levels of total proteins

and albumin were reduced due to the Paracetamol induced hepatotoxicity. The reduction is attributed to the initial damage produced and localised in the endoplasmic reticulum which results in the loss of P450 leading to its functional failure with a decrease in protein synthesis and accumulation of triglycerides leading to fatty liver. Reduction in the levels of SB, SALP, SGOT and SGPT towards the normal value is an indication of regeneration process.

The protein and albumin levels were also rose suggesting the stabilization of endoplasmic reticulum leading to protein synthesis. The protective effect exhibited by extracted at dose level of 200 mg/kg was comparable with the standard drug silymarin. The histological examination of the liver sections reveals that the normal liver architecture was disturbed by hepatotoxin intoxication. In the liver sections of the rats treated with extracted and intoxicated with Paracetamol; rats treated with ethyl acetate extract and intoxicated with Paracetamol the

normal cellular architecture was retained as compared to silymarin, there by confirming the protective effect of the extract. In accordance with these results, it may be hypothesized that tannin, saponins and flavonoids, which are present in extracts, could be considered responsible for the hepatoprotective activity.

The ethyl acetate extract of aerial parts of *Launaea intybacea* (Jacq) Beauv have shown very significant hepatoprotection against Paracetamol-induced hepatotoxicity in albino rats in reducing serum total bilirubin, SALP, SGPT and SGOT levels. It is also found that treatment with ethyl acetate extract of plant have brought down the elevated level of LPO and also significantly enhanced the reduced levels of SOD, CAT, GPX, GST and GSH. Liver section of *Launaea intybacea* treated animal group clearly showed normal hepatic cells and central vein thereby confirming hepatoprotective activity. In conclusion the ethyl acetate extract of *Launaea intybacea* could be an important source of hepatoprotective compounds.

REFERENCES:

1. Heba H. M. Hafez F. H. and Nadia, M. F. 2006, Silymarin modulates cisplatin – induced oxidative stress and hepatotoxicity in rats. *Journal of Biochemistry and Molecular Biology*.
2. Christian Zidorn., 2008), Sesquiterpene lactones and their precursors as chemosystematic markers in the tribe Cichorieae of the Asteraceae, *Phytochemistry*, 69, 2270–2296.
3. Kirtikar, K. R. and Basu, B. D. 1999 *Indian Medicinal Plants*, 2nd edition, Bishen sing Mahendra Pal Sing publication, Dehradun, Pp. 1432-1433
4. R.O. Recknagel. Carbon tetrachloride hepatotoxicity. *Pharmacological Reviews* 19(2):145-208 (1967).
5. S.K. Ashok, S.N. Somayaji and K.L. Bairy. Hepatoprotective effects of *Ginkgo biloba* against carbon tetrachloride induced hepatic injury in rats. *Indian J Pharmacol* 33(2): 260-6 (2001).
6. S.S. Handa, A. Sharma and K.K. Chakraborti. 1986 Natural products and plants as liver protecting drugs. *Fitoterapia*. 57: 307-45.
7. Sadique, J., Chandra, T., Thenmozhi, V. and Elango, V. 1987. The anti-inflammatory activity *enicostemma littorale* and *mullogo cerviana*, *Biochem Med. Metab. Biol.*, 37, 167-176.
8. Wargovich, M. J. Woods, C., Holli, D. M. and Zander M. E. 2001, Herbals, cancer prevention and health. *Journal of nutraceutical* 131, 3034-3036.
