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

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ABSTRACT
The present study was conducted to evaluate the hepatoprotective activity of ethyl acetate extract of aerial parts of launaea intybeca 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 intybeca 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 intybeca, 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 Intybeca 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 Intybeca 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 homogemate 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 intybeca 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 intybeca 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 intybeca 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 hepa-toprotective 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 biochemical parameters.

RESULTS AND DISCUSSION

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 hepatotoxicity. 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 functional failure with a decrease in protein synthesis and accumulation of triglycerides leading to fatty liver. Reduction in the levels of SB, SALP, SGPT and SGOT 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 extracts 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 hepatotoxicity intoxication. In the liver sections of the rats treated with extracts and intoxicated with Paracetamol; rats treated with ethyl acetate extract and intoxicated with Paracetamol the

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

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

* 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).

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

* Values of mean ± S.E.M. (n=6)
normal cellular architecture was retained as compared to silymarin, thereby 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.

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