Enliv® is a poly-herbal formulation that exists in a powder form. It contains the aqueous extract of eight potent medicinal plants: Aphanamixis polystachia, Phyllanthus niruri, Eclipta alba, Andrographis paniculata, Picrorhiza kurroa, Tinospora cordifolia, Naregamia alata, and Emblica officinalis. Some of these plants have been known to possess antihepatotoxic properties and have been used in the indigenous system of medicine.1-2 In the present study, attempts are made to ascertain the hepato-protective effect of Enliv® in paracetamol-induced hepatotoxicity in broiler chicks.

Healthy, vaccinated, day-old broiler chicks (n=45) weighing 41-42 g, were divided into three groups of 15 birds each and maintained under standard laboratory conditions. Group I served as the control group, while Groups II and III were considered as the experimental groups. Daily feed intake and weekly body weight gain of the chicks were recorded. Feed efficiency ratio (FER) was calculated by using the conventional formula.

Birds of Groups I, II and III were sacrificed, one at a time on the 24, 23 and 27th day respectively. A portion of the liver was collected from each bird immediately after sacrifice; from this, a small portion of it was preserved in 10% formalin for histopathological examination, while the remaining part was utilized to estimate biochemical assays such as, reduced glutathione content (GSH),3 protein (microestimation),4 aminotransferase activity,5 lipid peroxidation6 and protein (macroestimation).7

Liver samples, preserved in 10% formalin were processed, cut into 3-5 mm thick sections, and stained with hematoxylin and eosin. Data were analyzed using one-way ANOVA. P<0.05 was considered significant.

Group I (Control), fed with starter feed mixed with Enliv® 1 kg/ton feed (oral) followed by 50% ethanol (2.5 ml/kg) i.p., on 22nd day; Group II, fed with starter feed (oral) followed by paracetamol 250 mg/kg in 50% ethanol i.p., on 21st day; Group III, fed with starter feed mixed with Enliv® 1 kg/ton feed (oral) followed by paracetamol 250 mg/kg in 50% ethanol i.p., on 25th day; Values with dissimilar superscript vary significantly (P<0.01) from each other, n=15 in each group.

Enliv®-treated birds (Group III) showed decrease of ALT, AST activities, GSH content and increase of lipid peroxidation level of liver tissue. [Table 1] Paracetamol-treated birds (Group II) showed evidence of coagulative necrosis, whereas liver sections of birds pretreated with Enliv® followed by paracetamol treatment (Group III) showed evidences of mild congestion which was almost similar to that of the control chicks.

Table 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspartate amino transferase activity (mg of pyruvic acid formed mg⁻¹ protein hr⁻¹)</td>
<td>104 ±2.11a</td>
<td>69.89±2.13b</td>
<td>94.04±2.30c</td>
</tr>
<tr>
<td>Alanine amino transferase activity (mg of pyruvic acid formed mg⁻¹ protein hr⁻¹)</td>
<td>18.53 ±0.87a</td>
<td>7.02±0.40b</td>
<td>13.77±0.84c</td>
</tr>
<tr>
<td>Reduced glutathione content (n mole mg⁻¹ protein)</td>
<td>107.70 ±2.10a</td>
<td>68.09±1.91b</td>
<td>102.81±2.10a</td>
</tr>
<tr>
<td>Lipid peroxidation level (n mole 100 mg⁻¹ protein)</td>
<td>94.24 ±2.52±177.44±4.92±100.72±2.43a</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Values are mean±SEM; n=15 in each group.

Table 2

<table>
<thead>
<tr>
<th>Week</th>
<th>Feed efficiency ratio of broiler chicks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group I Control</td>
</tr>
<tr>
<td>1</td>
<td>2.31</td>
</tr>
<tr>
<td>2</td>
<td>2.23</td>
</tr>
<tr>
<td>3</td>
<td>2.17</td>
</tr>
<tr>
<td>Mean±SEM</td>
<td>2.24±0.04*</td>
</tr>
</tbody>
</table>

n=15 in each group. *P<0.01 when compared to control.
It has been reported that the simultaneous administration of ethanol and paracetamol may intensify the hepatotoxic action of the later in human beings. Present experiment also indicates that paracetamol causes a decrease of GSH and an increase in lipid peroxidation level of liver tissue of chicks, and corroborates the findings of Kapur et al (1994) in rat. Increase or decrease of alanine and aspartate aminotransferase enzyme activities depends upon the intensity of cellular damage. However, if the degenerative changes are intensive and continued, obviously the cellular enzyme activity will decrease because of the absence of de novo synthesis.

In this study, continuous feeding of Enliv® alone showed a lower feed efficiency ratio in broiler chicks. In addition, pretreatment of Enliv® reversed the paracetamol-induced decrease of glutathione and increase of lipid peroxidation level in liver tissue. Similarly, it also significantly blocked the paracetamol-induced decrease in alanine and aspartate aminotransferase enzymatic activities of liver tissue. These observations, coupled with histopathological findings in Enliv®-treated chicks may be an indication of the capability of hepatoprotection against paracetamol-induced hepatotoxicity.

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References


INDO – JAPANESE CONFERENCE
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Date : November 26 – 29th, 2005
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