Effect of Herbal Capsules on the Hepatic Enzymes in Comparison to its Crude Extract

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ABSTRACT
Liver, unlike any organ, is the largest solid organ in the body that helps for the metabolism of the drugs and food materials that contained toxins and other substances are metabolized and detoxified in the liver only. The enzymes are present in the liver are cytochrome P450, and other enzymes like SGOT and SGPT are used as evaluation parameters in the liver diseases. Apart from the food, many drugs cause liver damage by causing cellular damage to the liver. The liver enzymes permanently or temporarily imbalanced with the daily consumption of toxic drugs. If this damage is permanent, then the liver regeneration is not possible, and the body loses its capacity to metabolize the drugs and food. Herb and medicinal plants are used to treat liver disorders and help hepatic regeneration. They are found to be effective and safer compared to synthetic drugs. There are a lot of the chemical leads that were isolated from the herbs that are used to treat liver disorders. These leads were also patented for the formulations that are prepared from the extracts that were achieved from the herbs. In conclusion, the extracts of the plant Leptadenia reticulate and piper were incorporated into the herbal capsules. They were investigated for the activity in comparison to the standard drug and the extracts at the dose of 250mg/kg.

INTRODUCTION
Leptadenia reticulata is a local Indian herb that is well known for its pharmacological profile and its potency for the protection of liver against the liver failure or any other drug that cause hepatotoxicity [1]. It also has other properties like antioxidant and antidiabetic activity. It was tested as the ethanol and water extracts were showed liver protection property at a dose of 500mg/kg individually. The carbon tetrachloride method was used for the investigation and proved for the activity.
Liver, unlike any organ, is the largest solid organ in the body that helps for the metabolism of the drugs and food materials that contained toxins and other substances are metabolized and detoxified in the liver only. The enzymes are present in the liver are cytochrome P450 [2], and other enzymes like SGOT and SGPT are used as evaluation parameters in the liver diseases. Apart from the food, many drugs cause liver damage by causing cellular damage to the liver. The liver enzymes permanently or temporarily imbalanced with the daily consumption of toxic drugs. [3, 4] If this damage is permanent, then the liver regeneration is not possible, and the body loses its capacity to metabolize the drugs and food.

Herb and medicinal plants are used to treat liver disorders and help hepatic regeneration. They are found to be effective and safer compared to synthetic drugs [5]. There are a lot of the chemical leads that were isolated from the herbs that are used to treat liver disorders. These leads were also patented for the formulations that are prepared from the extracts that were achieved from the herbs. Out of those, the herbs were used to treat the hepatic diseases also [6]. These formulations were used to treat liver diseases like liver failure and hepatitis. Some drugs are found with no alternatives yet.

In this work, herbal capsules were prepared using the extracts of the plants of *Leptadenia reticulata* [7] and *Piper longum* extracts which were used in the ratio of 2:0.5 in terms of the weight.

**EXTRACT PROCESSING**

The plant parts were dried in the direct sunlight, and the Drying was done for two days, and the dried plant parts were powdered and then passed through sieve 40, and the fine powder was achieved. The power was used for the extraction of the crude extract using solvent ethanol. It is subjected to soxhlation, and the extract was filtered using the filter paper. The filtrate was evaporated using the rotary vacuum evaporator and the crude extract, which yielded 15.4% to the weight of the crude drugs. This was used directly to prepare the capsules and then filled in the hard gelatin capsules. The extracts were weighed in the ratio of 2:0.5 and the overall weight of the extract were 500mg per capsule, and the remaining volume of the capsule was filled with the starch or talc. The final weight of the capsules was 755mg.

**Phenol Content and Flavanol Content**

The TPC and TFC in the extract were determined using the UC spectroscopy, and the method used was by determining the standard curves of the gallic acid for phenols and quercetin for flavanols. This was used to determine the total phenol content and the total flavanol in the extract [8].

**Laboratory animals**

The *in vivo* screening of the activity was tested on the Swiss albino mice. The mice weighed about 45–70g, and the mice were kept in the conditioning air and normal humidity. They were given food and water freely with water also. The animals were classified into five groups which are having 6 in each group of the separation. The administration is as follows.

Group-1 as taken as a placebo group which were administered only with 1.5ml of the 0.9% of the saline solution via the oral route.

Group-2 was considered for the induction of the inflammation in the liver using the inducing agents but were not given any extract or the standard drug that cures liver toxicity caused by the induction.

Group-3 was considered as a standard group where the animals were given the only standard drug at a dose of 10mg/kg.

Group-4 was considered as extract group where the animals were administered with plant extract at 250mg/kg via the oral route.

Group-5 was considered to compare the formulation where the animals were administered with the powder that is removed from the capsules.

In the first method, liver toxicity was induced by CCl4 [4]. Carbon Tetrachloride was administered into the mice. The dose of 1.5ml of the CCl4 was given to the mice per kg body weight. The animals then proceeded with the same process for seven days. The drug administration was done half an hour before the administration of the induction agent.

In the second method, the hepato-toxicity was induced in the mice by injecting the paracetamol [9]. This was given at the dose of 2g/kg by suspending in saline solution after half an hour of the drug and extract administration. The animal experiments were conducted for a week, and then the animals were collected for blood.

On 7th day the animals were not administered with any drug, but they fast for 24 hrs. Then the mice were anesthetized using ether, and the blood was withdrawn from the retro-orbital plexus for the estimation of the liver enzymes [10]. Serum glutamase, transaminase, phosphatase was estimated in the standard procedures.

**DATA OF THE EXPERIMENT**

This study the values of the enzyme levels were estimated using the enzyme level estimation. The hepatoprotective activity of the formulation (Capsules)
Table 1: Effect of the herbal capsules on liver toxicity by carbon tetrachloride

<table>
<thead>
<tr>
<th>Group</th>
<th>Total bile (mg/dl)</th>
<th>TP (mg/dl)</th>
<th>SGOT (IU/L)</th>
<th>SGPT (IU/L)</th>
<th>ALP (IU/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saline solution</td>
<td>2.03±0.57</td>
<td>5.25±2.65</td>
<td>126.54±6.79</td>
<td>63.07±8.13</td>
<td>175.01±12.46</td>
</tr>
<tr>
<td>Inducer</td>
<td>6.11±0.83</td>
<td>7.14±0.98</td>
<td>267.12±7.05</td>
<td>354.16±3.68</td>
<td>298.43±26.72</td>
</tr>
<tr>
<td>Standard drug</td>
<td>2.73±0.56*</td>
<td>6.67±0.84*</td>
<td>159.36±5.42*</td>
<td>67.49±9.15*</td>
<td>181.08±8.19*</td>
</tr>
<tr>
<td>The crude extract of the plant</td>
<td>3.438±2.04*</td>
<td>5.1±2.132</td>
<td>162.04±25.01*</td>
<td>101.07±10.82*</td>
<td>216.06±4.16*</td>
</tr>
<tr>
<td>Herbal capsules</td>
<td>4.31±2.45*</td>
<td>6.47±0.91*</td>
<td>173.65±18.2*</td>
<td>78.24±8.14*</td>
<td>197.52±9.10*</td>
</tr>
</tbody>
</table>

Table 2: Effect of the herbal capsules on liver toxicity by Paracetamol

<table>
<thead>
<tr>
<th>Group</th>
<th>Total bile (mg/dl)</th>
<th>TP (mg/dl)</th>
<th>SGOT (IU/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saline solution</td>
<td>0.9±0.17</td>
<td>9.05±0.74</td>
<td>88.01±2.13</td>
</tr>
<tr>
<td>Inducer</td>
<td>2.04±0.32</td>
<td>8.41±0.65</td>
<td>152.62±4.94</td>
</tr>
<tr>
<td>Standard drug</td>
<td>0.93±0.83*</td>
<td>9.65±0.96*</td>
<td>103.07±3.12*</td>
</tr>
<tr>
<td>The crude extract of the plant</td>
<td>3.28±0.59*</td>
<td>8.04±0.43*</td>
<td>126.83±24.17*</td>
</tr>
<tr>
<td>Herbal capsules</td>
<td>0.92±0.28*</td>
<td>10.03±0.52*</td>
<td>130.34±2.56*</td>
</tr>
</tbody>
</table>

was estimated by estimating the enzyme levels. The standard drug and the extract were compared to the capsule formulation. The phenol content and the flavanol content were estimated as the 149mg of gallic acid equivalent in one gram of the extract and 83 mg of the quercetin equivalent in one gram of the extract. The protective effect of the extract and formulation on the liver was compared with the standard drug. The capsules showed an excellent activity compared to the extract and standard formulation in both the methods. The enzyme levels like glutamates and transaminases were also estimated to investigate the activity which was lowered, and the activity was higher when compared to the crude extract and the standard drug too.

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REFERENCES


CONCLUSION

In conclusion, the extracts of the plant Leptadenia reticulata and Piper longum were incorporated into the herbal capsules. They were investigated for the activity in comparison to the standard drug and the extracts at the dose of 250mg/kg.

CONFLICT OF INTEREST

Authors declared no conflict of interest.

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None.


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