Phytochemical analysis and biological activity of methanol extract of the lichen Pleurosticta acatabulum

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Introduction

Lichens have a very important role in both human and animal nutrition, as well as in the pharmaceutical industry and traditional medicine (1). Lichens synthesize a large number of secondary metabolites and most of these metabolites are unique to the lichen. The extracts of the lichens and their secondary metabolites exhibit a broad spectrum of biological activity (2).

Material and methods

Lichens were collected at the site of the eastern slope of the mountain Kopaonik on the territory of the Republic of Serbia. Extraction was performed with methanol using the Soxhlet apparatus. The phytochemical analysis was carried out by high-performance liquid chromatography (HPLC). The antioxidant activity of the lichen extract was evaluated by measuring the total anti-oxidative capacity, reducing capacity, inhibition lipid peroxidation and scavenging capacity on 2,2-diphenyl-1-picrylhydrazyl (DPPH) and hydroxyl (OH) radicals. To determine total phenols and flavonoids, we used spectrophotometric methods (3). In vitro anticancer activity on HeLa S3 adenocarcinoma cervix and LS174 human colon adnecarcinoma cells line was evaluated by MTT assay (4).

Table 1. Total antioxidant capacity, phenolic and flavonoid content

<table>
<thead>
<tr>
<th>Lichen extract</th>
<th>Total antioxidant capacity (mg AA/g)</th>
<th>Phenolic content (µg GA/mg of extract)</th>
<th>Flavonoid content (µg RU/mg of extract)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleurosticta acatabulum</td>
<td>74.29±1.36</td>
<td>73.45±0.82</td>
<td>15.42±0.55</td>
</tr>
</tbody>
</table>

Figure 1. HPLC chromatograms of standards and methanol extract of lichen Pleurosticta acatabulum (254 nm): 1: salazinic acid; 2: norstictic acid; 3: protocetraric acid; 4: evernic acid

Table 2. Antioxidant activity: Inhibition lipid peroxidation, DPPH and OH scavenging activity (IC50) and reducing power (absorbance)

<table>
<thead>
<tr>
<th>Lichen extract</th>
<th>Inhibition lipid peroxidation IC50 (µg/ml)</th>
<th>DPPH scavenging activity IC50 (µg/ml)</th>
<th>OH scavenging activity IC50 (µg/ml)</th>
<th>Reducing power-Absorbance (700 nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleurosticta acatabulum</td>
<td>74.30±1.48</td>
<td>48.52±0.77</td>
<td>163.83±0.95</td>
<td>0.25</td>
</tr>
<tr>
<td>Ascorbic acid</td>
<td>&gt;1000</td>
<td>6.05±0.34</td>
<td>150.55±2.31</td>
<td>2.113</td>
</tr>
</tbody>
</table>

Figure 2. Cytotoxic activity (IC50) of the extract on the HeLa S3 and LS174 cells line after 24 h and 72 h incubation

The present study provides data for supporting the use of P. acatabulum extract as natural antioxidant agents and confirms that this extract represents a significant source of phenolic compounds.

Conclusion

References