

***In-Vitro* Antioxidant and Phytotoxic Properties of Lichen Species *Heterodermia obscurata* Locally Common in Belihuloya, Sri Lanka**

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Synthetic medicinal drugs and weedicides are causing adverse side effects. Natural bioactive compounds are the best solution to reduce such effects. We investigated antioxidant and phytotoxic properties of the lichen species *Heterodermia obscurata* identified using standard keys from Belihuloya. Methanol, acetone and hexane extracts of fresh lichen samples were prepared and their antioxidant activity was measured using 2,2-diphenyl-1-picryl hydrazyl (DPPH), while the reducing ability was observed using ferric reducing antioxidant potential (FRAP) test using Ascorbic acid as the positive controller for both tests. The total phenolic content (TPC) was evaluated using the Folin–Ciocalteu reagent assay and calculated as gallic acid equivalents for the dry weight of lichen. Further, seed germination and the root length inhibition assays were performed using radish seeds (*Raphanus sativus* L.) to evaluate the phytotoxicity of the extracts using relevant solvents as the negative controllers. Three replicates were used for each and every test. Methanol extract showed the highest antioxidant activity in DPPH assay ( $IC_{50} = 273.4$  ppm,  $R^2 = 0.927$ , p-value = 0.009, n=3) and the highest absorbance in FRAP assay ( $0.277 \pm 0.051$ ) compared with Ascorbic acid. TPC of the same extract was significantly higher ( $16.451 \pm 3.802$ ) compared to all the other extracts (p-value < 0.05). TPC of the extracts showed a strong positive correlation with radical scavenging activity (0.806, p-value < 0.2) and the reducing potential (0.949, p-value < 0.1). Inhibition of radish seed germination was significantly high in methanol extract of *H. obscurata* compared to the negative controller after 24 h and 72 h of exposure (p-value < 0.05). Similarly, the methanol extract of the lichen had the highest root inhibition activity after exposure for five days. Hexane extract did not show any bioactivity. Hence, we propose the methanol extract of the *H. obscurata* for further studies on applications of its bioactivity.

**Keywords:** Antioxidant, Bioactivity, *Heterodermia obscurata*, Lichens, Phytotoxicity