

Abstract

Algae are considered as a source of bioactive compounds as they are able to produce a great variety of secondary metabolites characterized by a broad spectrum of biological activities. *Rhizoclonium hieroglyphicum*, is edible alga and richest in cell-wall polysaccharides. Polysaccharides are used as a natural polymer in various applications, including as thickening or gelling agents in food manufacturing and pharmaceutical production. The algal collection was made from water bodies of Zoological Garden Lahore in October 2019. The alga was slender and soft. It was attached to substrate by rhizoids and had reticulate chloroplast. Phytochemical screening reveals the presence of alkaloids, reducing sugar, tannins and terpenoids. The GC-MS analysis of sample revealed that low fatty acids contents were present in *R. hieroglyphicum* done by folch method. 9-Hexadecanoic acid was found to be the major component (46.57%). Other bioactive compounds including hydrocarbons, fatty acids and esters are also extracted from sample extract. Antioxidant activity of the *R. hieroglyphicum* was estimated performing four antioxidant assays which are total phenolic content quantification (TPC), total antioxidant activity (TAA), ferric reducing antioxidant power assay (FRAP), and DPPH radicle scavenging action (DPPH). The highest value of TPC was exhibited by the chloroform extract of *R. hieroglyphicum* (25.22 ± 0.33 μg GAE per mg extract) and the lowest phenolic content was registered with the methanolic extract (15.05 μg GAE/mg). The total antioxidant activity of algal sample was evaluated by phosphomolybdenum complex formation method. The methanolic extract exhibited the significantly highest value (13.94 μg AscAE/ mg) and the lowest activity was registered by aqueous extract. The highest ferric reducing antioxidant power was noted with the *n*-Hexane extract (257.83 μM Trolox per mg extract). The chloroform extract of algal sample extract shows the highest (77.6%) radicle scavenging activity. The results of present study indicated that methanol and chloroform extract of *R. hieroglyphicum* showed the potent antioxidant properties. The presence of some of these bioactive constituents in the algal extract may provide the scientific evidences for many medicinal effects of this algae.