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Antioxidant activity, proximate analysis and metal ion analysis of some selected Sri Lankan marine algae

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Marine algae are known to contain a wide variety of bioactive compounds, which have commercial applications in the medical, pharmaceutical, cosmetic, agricultural and food industries. Algae can biosynthesize a vast diversity of primary and secondary metabolites including carotenoids, phenolic compounds, phycobilins, sulphated compounds and vitamins which lead to antioxidant activity. The objectives of the current study are to explore the antioxidant activity of some randomly selected algae, two species of green algae; *Ulva reticulata* and *Dictyosphaeria versluysii,* two species of red algae; *Jania intermedia*, and *Dermonema virens* and one species of brown algae; *Sargassum natans*. In addition, approximate chemical composition and presence of metal ions in selected marine algae were investigated. Eighty percent methanolic extracts were prepared from all selected algae. Using sample stock solutions (1000 ppm), total phenol content (TPC), total flavonoid content (TFC), ferric reducing antioxidant power (FRAP), 1,1-diphenyl-2-picryl-hydrazyl (DPPH) free radical scavenging activity, 2-azino-bis (3-ethylbenzothiazoline-6-sulfonic) acid ABTS radical scavenging activity (dose response: n=3) and oxygen radical absorbance capacity (ORAC) (all were screened at 100 µg/ml:n=3) were investigated. Approximate chemical analysis tests and inductively coupled plasma-optical emission spectroscopy (ICP-OES) method for metal ion analysis were conducted for *U. reticulata* and *S. natans*. Among tested marine algae, red algae *J. intermedia* showed the highest TPC (22.38±0.23 mg gallic acid equivalents/g extract). Brown algae *S. natans* showed highest TFC (111.49±5.8 mg quercetin equivalents/g extract), FRAP (1880.95±30.6 mmol trolox equivalents (TE)/g extract), DPPH free radical scavenging activity (22.51±0.16%) and ABTS radical scavenging activity (39.64±1.72%). *J. intermedia* showed highest ORAC activity (82.28±10.11 mg trolox equivalents (TE)/g of extract) followed by *S. natans* (68.84±6.71 mg (TE)/g of extract). *S. natans* showed the least IC_{50} value for ABTS radical scavenging activity (143.83±2.80 µg/ml) compared to other tested marine algae. *U. reticulata* showed the highest amount of fat and carbohydrate while *S. natans* contained the highest amount of protein and dietary fiber. A comparatively higher amount of total metal ions was in *S. natans* compared to *U. reticulata*. *Sargassumnatans* can be identified as a marine algae with the highest antioxidant potential among tested algae.

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