

Evaluation of Nutritional Composition and Antioxidant Properties of Selected Seaweeds Available in the Northern Region of Sri Lanka

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The demand for seaweed is increased recently due to its high nutritional and medicinal values. Therefore, this study evaluated the nutritional composition and antioxidant properties of methanolic extracts of selected green (*Enteromorpha* spp.), brown (*Turbinaria* spp.), and red (*Laurencia* spp.) seaweeds collected from the coastal area of Delft Island in the Northern region of Sri Lanka. Collected samples were dried under shade until they reached a constant moisture content. These dried samples were powdered and analyzed for proximate composition (crude protein, crude fat, crude fiber, ash, moisture, and carbohydrate contents) by AOAC methods. Among the three selected species, *Laurencia* spp contained the highest ($p < 0.05$) amount of crude protein ($42 \pm 2.31\%$), and ash content ($38.99 \pm 1.02\%$), whereas *Enteromorpha* spp had the highest ($p < 0.05$) carbohydrate content ($47.92 \pm 2.07\%$) and *Turbinaria* spp contained the highest ($p < 0.05$) amount of fat content ($2.34 \pm 0.02\%$). The crude fiber content of the selected seaweeds ranged from 8.96 ± 0.15 to $9.73 \pm 1.10\%$. The selected dried samples were extracted by 70 % v/v methanol for different durations (2, 4, and 6 hours) at 200 rpm using a mechanical shaker for the antioxidant analysis. Extracts were analyzed for antioxidant properties such as total phenolic content (TPC) [expressed as Gallic Acid Equivalent/ g dry matter (GAE/g DM)], total antioxidant capacity (TAC) [expressed as Ascorbic Acid Equivalent/ g DM (AAE/g DM)], and 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity (expressed as IC_{50} value which is inversely related to antioxidant activity). The highest TPC and antioxidant activity were obtained in the extract obtained after 6 hours of extraction compared to 2 and 4 hours. Among the species analyzed, *Turbinaria* spp exhibited the highest ($p < 0.05$) content of TPC (8.10 ± 0.72 mg GAE/g DM), TAC (4.49 ± 0.43 mg AAE/g DM) and antioxidant activity (IC_{50} value- 0.08 ± 0.05 mg/ mL). Gas chromatography analysis identified the different types of fatty acids present in three seaweed species (C8:0, C10:0, C11:0, C11:1, C12:0, C16:0, C16:1, C17:1 and C18:1). This study concluded that the tested seaweeds showed the beneficial health properties and could be effectively used to prepare value-added food products.

Keywords: Antioxidant properties, Nutritional composition, Seaweeds