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Antioxidant Capacity and Polyphenol Content of Brown Seaweeds after Heat Processing

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Seaweeds or marine macroalgae are renewable living resources used as food, feed and fertilizer in many parts of the world. These produce a great variety of secondary metabolites characterized by a broad spectrum of biological behavior such as antibacterial and antioxidant capacities. Over 500 different species of seaweed from Irish coast have been identified out of which 147 species belong to brown algae. The traditional role of antioxidants is to inhibit the development of oxidative rancidity in fat-based foods, because oxidation is a naturally occurring process within the human body, a balance with antioxidants must exist to maintain health. It has long been perceived that thermally processed food, fruits and vegetables have altered nutritional value than fresh produce because of variation in some physiochemical characteristics.

The present study aims at evaluating the effect of heat processing on polyphenol content and radical scavenging capacity of three species of raw and hydrothermally treated (autoclaved) Irish brown seaweeds; namely Himanthalia elongata, Laminaria saccharina and Laminaria digitata.

### Materials and Methods

**Irish seaweeds**

(H. elongata, L. saccharina, L. digitata)

**Heat treatment**

- Sample/water ratio: 1:5
- Temperatures: 85, 95, 100, 110 °C
- Time: 15 minutes

**Extraction**

- Seaweed samples were ground with liquid nitrogen and extracted with methanol (40%) under nitrogen atmosphere for 2 hours.
- The extraction was carried out at 40 °C at 100 rpm in a shaker incubator followed by centrifugation at 9468g for 15 minutes.
- The resulting extracts were concentrated under vacuum on a rotary evaporator.

**Antioxidant analysis**

- DPPH

**Phytochemical analysis**

- Total phenolic content (TPC)
- Proanthocyanidin content (IPC)

**Results**

The TPC of brown seaweeds increased by thermal processing at 95 °C by 64, 75.6 and 48.8% as compared to raw H. elongata, L. saccharina and L. digitata, respectively. The PC maximally increased by 94.3, 95.7 and 155.6% at 95 °C, as compared to raw H. elongata, L. saccharina and L. digitata, respectively. The PRAP value increased maximum in L. digitata (2.8-fold) followed by H. elongata (2.6-fold) and L. saccharina (2.4-fold) at 110 °C.

**Conclusion**

Present work revealed that Irish brown seaweeds are a good source of bioactive compounds. They have potent antioxidant capacity which was significantly increased by heating.

Heat processing not only enhanced the contents of biologically active compounds in seaweeds but also the biological activity associated with these compounds as compared to the unprocessed seaweeds. These findings could provide new avenues for developing new nutraceutical foods based on seaweeds with particular considerations of processing conditions.

**Literature Cited**


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