

Elemental and radionuclide analysis of commercially available edible seaweeds in Sri Lanka

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Seaweeds are good bio-accumulators. On the other hand, they are a popular source of food consumed worldwide. In Sri Lanka, edible seaweeds are sold in three forms, dried algae as china-moss (DC), processed moss jelly sheets (PM) and powdered jelly (PJ) products, but, information on element and radionuclide contents of these are scarce. In the current project, we analyzed for elements and radionuclide contents in 14 edible seaweed samples including eight DC (2 were obtained directly from growers), four PM and two PJ available for sale, during March 2011. Samples were subjected to multi-elemental analysis for K, Na, Mg, Ca, Fe, Cu, Zn, Cd, Cr, Ni, Mn and Pb using Flame Atomic Absorption Spectroscopy. Total reflection x-ray fluorescence spectroscopy was used to determine the As, Hg, Sr and Ti contents. Gamma ray spectroscopy was used for evaluation of natural and man-made radio isotopes including ⁴⁰K, ¹³⁷Cs, ²²⁶Ra. Elemental concentrations and radio activity of a standard edible portion of different product types were compared with the International Food Standards. According to the results the ash percentage varied from 1.2 % to 27.9 % in samples and DC > PM > PJ. The two DC samples obtained from growers showed the highest elemental concentrations. Highest amount of Cr (49.80 mg/kg dry weight) was recorded only in one other DC product. Some products contained Pb slightly higher than the Estimated Daily Intake (EDI). All the other element concentrations were below EDI. According to the radionuclide analysis, ¹³⁷Cs was not found in any of the sample, ²²⁶Ra was found in one sample of PM (284±4 Bq/kg wet wt.) while ⁴⁰K was present in all the fourteen samples (ranging from 286±94 to 6788±302 Bq/kg wet wt). However the percentage error and Minimum Detectable Limit (MDL) of radio activity was higher due to the small quantities used in this analysis. The study showed that the commercially available alga products in Sri Lanka are safe for human consumption.

Keywords: seaweeds, algae, elements, radionuclides, Sri Lanka

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