An assessment of heavy metals and *Escherichia coli* contamination of selected seaweeds collected from southern coastal area of Sri Lanka

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Seaweeds are one of the potential marine bio-resources for food and feed use that contain substantial amounts of minerals, vitamins, essential amino acids and dietary fibre. Considering the current level of environmental pollution and non-hygienic conditions where they grow, seaweeds possess a high risk of contaminating the food supply chain with potentially harmful *Escherichia coli* and heavy metals. Present study aimed at investigating selected heavy metal contaminations and microbiological safety in terms of *E. coli* level in three selected edible seaweeds collected from southern coastal areas of Sri Lanka. Seaweeds used in this study were *Ulva reticulata, Caulerpa racemosa* and *Sargassum wightii*. Mercury, cadmium, arsenic and lead levels of the three species were determined using atomic absorption spectroscopy. Single variable factorial experiment was conducted to assess the suitable heat treatment to achieve optimal microbial safety level. Heat treatment was carried out at 90 °C for 1, 3 and 5 min. Two replicates were used for each sample. *E. coli* level in fresh and heat treated seaweed samples were determined using most probable number (MPN) technique. Mercury level (0.030±0.014 ppm) was significantly high ($p<0.05$) in *C. racemosa* and both cadmium (0.112±0.018 ppm) and arsenic levels (2.042±0.171 ppm) were significantly low ($p<0.05$). *E. coli* was detected within the range of 59±22.6 to 350±155.6 MPN/g in fresh seaweed samples and it could be reduced up to non-detectable MPN levels by providing the heat treatment at 90 °C for 3 min. All the heavy metals tested were significantly ($p<0.05$) lower than the regulated EU Standard Commission Regulation (EC) No 1881/2006 limits for vegetables and leafy greens. Pertaining to the above results, all three seaweed species were safe to consume with respect to heavy metal levels and after mild heat treatment to mitigate *E.coli* growth.

Keywords: *Escherichia coli*, seaweeds, heavy metal

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