Extraction of Crude Protein from *Sargassum crassifolium* Harvested from the South Coast of Sri Lanka and to Determination of the Functional Properties of the Crude Extracts

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Oceans provide an attractive domain for nutrient sources with the rising global population and decreasing available land and freshwater resources. Marine macroalgae, *Sargassum crassifolium* has a higher growth rate around the country. It has 9–20% protein content which changes based on the environmental conditions. This study aimed to compare different effective processes to extract crude protein and studying the functional properties of the crude extract from *S. crassifolium* harvested from Matara, Sri Lanka. Proximate composition was determined and extracted crude protein from *S. crassifolium* using different protocols (water, salt, ethanol, and alkaline). Extracted crude protein was lyophilized and used for protein quantification and all extracts were analysed by using 15% SDS-PAGE. Selected best yield ratio was used to observe antioxidant properties and antimicrobial properties. Raw seaweed contains 82.61% ±0.47 moisture, 2.45% ±0.47 crude fat, 10.29% ±0.35 protein, and 3.52% ±0.19 ash respectively. Based on yield analysis 1:3 (water extraction), 4% (salt extraction), 1:3 (alkaline extraction) and 1:4 (ethanol extraction) were selected as best. Developed protocols containing 13.34% ±0.97 (Water extraction), 17.69% ±1.39 (Salt extraction), 4.39% ±0.44 (Alkaline extraction) and 9.74% ±0.56 (Ethanol extraction) crude protein respectively ($p<0.05$). All treatments showed a low-intensity band pattern with 15% SDS-PAGE, confirming the characteristics of the protein. For DPPH radical scavenging activity, the salt extract showed higher activity with 58.94% ±1.52, and ethanol extract showed the highest iron-chelating and low malondialdehyde concentration ($p<0.05$). Results of Total Plate Count showed less antibacterial activities among crude protein extracts of *S. crassifolium* ($p<0.05$). These results conclude that crude protein produced from *S. crassifolium* has good antioxidants, metal chelating, and antibacterial properties which can be used in the food industry.

Keywords: Sargassum crassifolium, Crude protein, Antioxidant, Metal chelating, Antibacterial