

**PRODUCTION OF BIOACTIVE PEPTIDES USING  
CRUDE WATER EXTRACTS FROM  
*Sargassum crassifolium* AND *Ulva lactuca*  
COLLECTED FROM SOUTHERN COAST OF SRI  
LANKA AND DETERMINE ITS FUNCTIONAL  
PROPERTIES**

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## ABSTRACT

*Ulva lactuca* and *Sargassum crassifolium* are two abundant green and brown macroalgae species in Sri Lanka which are rich with bioactive and functional ingredients, but in the local context, few researches have been carried out to identify them. This study aims to determine the best enzyme treatment to produce bioactive peptides from crude water extracts of *Sargassum crassifolium* and *Ulva lactuca* and to determine the functional properties of its hydrolysates. A previously developed water extraction method was used to extract crude proteins from *Ulva lactuca* (1:4) and *Sargassum crassifolium* (1:3). Enzyme hydrolysis was done by using papain,  $\alpha$ -chymotrypsin, elastase, and protease enzymes (1:100) under their optimum temperature and pH for 0, 3, 6, 9, 12, 24 hours, and each treatment was inactivated under 100°C for 15min. 15% SDS PAGE were executed for protein hydrolysates of each seaweed species to identify the best enzyme treatment. Among all the treatment, 0hr followed with heat inactivation was selected as the best since all the hydrolysates show a similar band pattern. Functional properties including antioxidant activity (DPPH assay), metal chelating activity (ferrozine method), and antibacterial activity (Agar well diffusion method) for locally isolated *E.coli*, *Salmonella sp.*, *Micrococcus sp.* and Total Plate Count were done for the selected treatments. All protein hydrolysates showed strong antioxidant activity ( $p < 0.05$ ) except peptides produced by elastase. *Ulva lactuca* protein hydrolysates showed highest antioxidant activity (papain (76.89 $\pm$ 0.04%), protease (74.09 $\pm$ 0.02%),  $\alpha$ -chymotrypsin (68.08 $\pm$ 0.03%) elastase (44.20 $\pm$ 0.17%)) than *Sargassum crassifolium* protein hydrolysates (protease (66.98 $\pm$ 0.03%),  $\alpha$ -chymotrypsin (60.84 $\pm$ 0.06%), papain (57.45 $\pm$ 0.09%), elastase (5.64 $\pm$ 0.01%)) ( $p < 0.05$ ). However, all the protein hydrolysates showed low Fe<sup>2+</sup> chelating activity ( $p > 0.05$ ). None of the hydrolysates produced showed antibacterial activity against tested microbes. Thus, all the protein hydrolysates of *Ulva lactuca* and *Sargassum crassifolium* at 0hr followed with heat inactivation had strong antioxidant activity, low Fe<sup>2+</sup> activity, and no antibacterial activity for tested microbes.

**Keywords:** *Ulva lactuca*; *Sargassum crassifolium*; water extraction; enzyme hydrolysis; Functional Properties.