

Extraction and quantification of edible alginates from selected brown algae species in Ahangama and Beruwala rocky intertidal reefs, Sri Lanka

¹Kodikara S.S.M.*, ¹Thilakarathna R.M.G.N. and ²Yapa Y.M.A.L.W.

¹Faculty of Fisheries and Marine Science & Technology, University of Ruhuna, Matara

²Faculty of Science, University of Ruhuna, Matara

*Email: senurisiyathmakod@gmail.com:

Abstract

Seaweeds are comprised with large concentrations of polysaccharides and bioactive compounds. Sodium Alginate (SA) extracted from brown algae is a biodegradable, non-toxic polymer and it is the most adaptable polysaccharide found in nature. Sri Lanka harbours a rich diversity of macroalgae enriched with bioactive compounds and polysaccharides such as SA. This study was carried out to extract and quantify the SA content of brown algae *Sargassum crassifolium*, *Sargassum ilicifolium*, *Sargassum turbinatifolium*, *Padina* sp., *Dictyota* sp., and *Turbinaria ornata* in Ahangama and Beruwala rocky reefs in 2023. Fresh samples 1 kg of each species were collected from two sites. The SA was extracted and validated by using FT-IR spectroscopy. Among the species collected, *S. crassifolium* had the highest mean yield of SA (Ahangama; $1.9502 \pm 0.0979\%$ DW, Beruwala; $1.7897 \pm 0.0100\%$ DW) and *Padina* sp. had recorded the lowest mean of SA (Ahangama; $0.3393 \pm 0.0055\%$ DW, Beruwala; $0.0046 \pm 0.0002\%$ DW). ANOVA tests were conducted to determine statistical significance. There was a significant difference in the SA yield among the different brown seaweed species in the Ahangama study site ($F_{(3,33)} = 13.004$, $p < 0.05$). *S. crassifolium*, *S. ilicifolium*, *S. turbinatifolium* and *Padina* sp. of Ahangama reef have also recorded a higher yield of SA than the Beruwala reef ($F_{(3,33)} = 13.004$, $p < 0.05$). Moreover, methanolic extracts gained from selected seaweeds exert a wide range of functional groups such as O-H stretching for Alcohol and Phenol, C-C stretching for Aromatics, C-N stretching for Aliphatic amines etc. Results of this study revealed that SA yield varies among brown algae species as well as the same species in different locations and all alginate levels of the species were lower than the previous studies. Although the SA extraction method was not appropriate for the production of alginate at an industrial scale, it was effective in obtaining pure alginate.

Keywords

Brown seaweed, sodium alginate, Sri Lanka, Ahangama reef, Beruwala reef