



## Preliminary investigation of Bioplastic Production using Seaweed by Green Production Method

S. Priyanchanaa\*

*Department of Bio-Science, Faculty of Applied Science, University of Vavuniya, Sri Lanka*

**Abstract:** Bioplastics are one of the solutions to reduce petroleum-based plastics in many products. Seaweeds have a higher potential in order to be used in bio plastic production. This study elaborates on the bioplastic production from Alginate, which is known as seaweed hydrocolloid extracted from brown algae. The ultrasound-assisted extraction had been used to extract alginate from *Sargassum* (brown algae). Further, different concentrations of alginate solutions 0.5%, 2.75% and 5.0% were assessed to identify the higher resistant bioplastic film according to the thickness, colour, opacity and mechanical analysis. For the bioplastic production, the extracted solutions were diluted with distilled water, and 2% of glycine was added before being kept in the bioreactor. They were kept until the temperature increased up to 45°C and then spread in Petri dishes for oven-dry purposes. Further, the samples were preconditioned, and bioplastic films were obtained. The thickness of the plastic was directly proportional to the alginate concentration diluted in the solution. Accordingly, the thickness was high for the 5.0g concentrated alginate solution. Colourimetric analysis for bioplastic indicated the concentration of alginate directly influenced the colour differences, tending slightly yellow while alginate was added. The opacity was lower for the 2.75g concentrated alginate solution. In addition, it was able to observe, break in 0.5g concentrated alginate when applying force. 2.75g and 5.0g concentrated alginate solutions have higher tensile strength, which is significant for packaging purposes. By analyzing these properties 2.75g concentrated alginate can form higher resistant bio plastic film. This can be used mainly in packaging. In the concern of sustainable alginate production, it is required to enhance seaweed cultivation in marine, reduce the usage of organic solvents and also to decline the water footprint.

**Keywords:** Bioplastic, Green production, Seaweed, Sargassum