

## **Characterization of Kappaphycus sp. and Padina sp. as biosorbents for heavy metal ions removal**

### **ABSTRACT**

The determination of iron, copper and zinc metal ions removal has been conducted using seaweeds (*Kappaphycus* sp. and *Padina* sp.) as biosorbents. The seaweed was dried using two different drying techniques: oven drying (60 °C, 80 °C and 100 °C) and sun drying. The main functional groups responsible for the metal bindings in seaweed were identified using Fourier transform infrared spectroscopy. It showed that carboxyl, ether, alcoholic, and amino groups participated in the ionic exchange by functional groups on the surface area of metal-treated and untreated seaweed. Phytochemical analysis was conducted to determine the total phenolic content of the samples, as polyphenols are well known for metal binding. In comparison to the other drying techniques, oven-dried (60 °C) for *Padina* sp. ( $0.2133 \pm 0.0125$  mg GA/g DS) and *Kappaphycus* sp. ( $0.0882 \pm 0.0071$  mg GA/g DS) had the highest phenolic content. Inductively coupled plasma – optical emission spectrometry was also used to measure the reduction of heavy metal concentration in the biosorption process. Sun drying for both biosorbents, *Kappaphycus* sp. (86.08%) and *Padina* sp. (72.75%), achieved high metal adsorption levels for copper ions. According to the results, the rank of metal adsorption abilities of the samples by drying method is oven-dried (60 °C) < oven-dried (80 °C) < oven-dried (100 °C) < sun-dried.