

## **Effects of different plasticizer concentration on characteristics of biofilms made from semirefined carrageenan (*Kappaphycus alvarezii*)**

### **ABSTRACT**

*Kappaphycus alvarezii* is a carrageenan-rich seaweed, which has good potential as a substitute for biodegradable biofilms. Due to brittleness of seaweed biofilms, plasticizer agent(s) is added to improve their elasticity. This study investigates the effects of various concentrations (10 – 30%, w/w) of glycerol and sorbitol as combined plasticizers on the physio-chemical properties of biofilms made from semi-refined carrageenan (SRC) extracted from seaweed (*Kappaphycus alvarezii*) obtained from Semporna, Sabah. The results showed that FTIR spectra showed no significant difference in all the biofilms. Biofilm with combined glycerol and sorbitol at 1:1 ratio has the highest tensile strength at  $10.9 \pm 1.8$  MPa, but with lower elongation at break of  $4.5 \pm 1.1\%$ . Increasing the concentration of the combined plasticizers caused anti-plasticization effects. The SEM results showed morphology of the biofilms with combined plasticizers were smoother and structurally better arranged. The concentration of the combined plasticizers did not significantly affect the swell ability and biodegradability of the biofilms as they are hydrophilic polymers in nature. All biofilms were completely degraded after one day of burial tests. Although the tensile strength of the SRC biofilms was still lower for heavy duty like carrier plastic, nevertheless they show promising potential as "green" food wrapping due to its high biodegradability.