

# Preparation and characterization of nanocomposite films containing seaweed derivatives with different concentration of cellulose nanofibers

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## Abstract:

Biodegradable film from bio-based materials have a potential to replace the common plastic that can reduce waste disposal problems, besides it also helps to overcome depletion of non-renewable resources such as fossil fuels. The purpose of this study is to develop bio-nanocomposite film from 2% (w/w) of seaweed derivatives from *Eucheuma Cottonii* species as biopolymer with 0.9% (w/w) glycerol (G) and reinforced with different concentration of cellulose nano-fibers (CNF). Hence, the characterization of seaweed derivatives plasticized with glycerol based film containing 0,5,10 and 13% (w/w) of CNF were observed using mechanical and physical properties such as tensile strength and elongation at break, thickness, moisture content, opacity and solubility in water. Overall, seaweed derivatives film that properly plasticized with glycerol reinforced with CNF improved overall material properties in term of thickness, barrier and flexibility and also has higher tensile strength and elongation at break compared to the control (unplasticized) seaweed derivatives film only. Meanwhile, it shows similar trend for all of the seaweed derivatives. To conclude, all of the biopolymer derived from the seaweed derivatives can be used as films as it fulfill the requirement of bio-based material by having good mechanical properties under the range of 10-100 MPa of TS and EAB >10%.

**Keywords:** Seaweed derivatives; Plasticizers; Cellulose Nanofibers (CNF); Biopolymer; Mechanical; Physical properties

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