

## Productivity, biochemical composition and biofiltering performance of agarophytic seaweed, *Gelidium elegans* (Red algae) grown in shrimp hatchery effluents in Malaysia

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### Abstract

Aquaculture systems may release large amounts of nutrients into the marine ecosystem that can lead to eutrophication. Many seaweed species are efficient in reducing the nutrient concentration in aquaculture waste. In this study, the agarophyte *Gelidium elegans* originating from Korea was investigated for bioremediation of tiger shrimp (*Penaeus monodon*) broodstock effluent (SBE) in a shrimp hatchery in Malaysia. The *G. elegans* was cultivated in SBE using a semi-continuous culture system to evaluate the effects of elevated nutrients on the biomass, growth rate, quality and quantity of agar, pigment content and biochemical composition of seaweed. In the treatment containing *G. elegans*, pollutant nutrient concentration was reduced by 100%, and by 78.7%, 47.9%, and 19.6% for ammoniacal-nitrogen, nitrite, nitrate, and orthophosphate, respectively. The seaweed grew well ( $1.4 \pm 0.3\% \text{ d}^{-1}$ ) in SBE and produced appreciable amounts of protein (3.8% DW), carbohydrate (41.4 % DW) and agar (25.9% DW), that were significantly enhanced when cultured in the SBE compared to control. The photosynthetic performance of *G. elegans* assessment using a Diving-PAM showed the healthy condition of the grown seaweed without any indication of stress in shrimp hatchery effluent. Results showed that *G. elegans* has biofiltering and bioremediation potential for the shrimp hatchery effluent.

**Keywords:** *Gelidium elegans*, Red seaweed, Bioremediation, Pulp, Agar, Biochemical, Malaysia

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