

## **Evaluation of growth rate and semi-refined carrageenan properties of tissue-cultured *Kappaphycus alvarezii* (Rhodophyta, Gigartinales)**

### **Abstract**

This study aimed to evaluate and compare the quality of κ-carrageenan obtained from tissue-cultured and field-cultured *Kappaphycus alvarezii*. Carrageenan properties including yield, viscosity, gel strength and sulfate content were studied. After 60 days of cultivation, tissue-cultured *K. alvarezii* showed a higher growth rate ( $6.3 \pm 0.01\%$  day<sup>-1</sup>) than field-cultured seedlings ( $3.4 \pm 0.3\%$  day<sup>-1</sup>). The obtained carrageenan yield from tissue-cultured ( $67.3 \pm 16.4\%$ ) was higher than field-cultured *K. alvarezii* ( $51.5 \pm 21.0\%$ ). Gel viscosity of carrageenans from tissue-cultured *K. alvarezii* ( $1280.0 \pm 25.0$  cP) was found significantly higher than field-cultured samples ( $87.8 \pm 20.9$  cP). The 1.5% gel solution of tissue-cultured and field-cultured *K. alvarezii* exhibited gel strengths of  $703.5 \pm 14.1$  and  $288.3 \pm 19.3$  g cm<sup>-2</sup>, respectively. The average sulfate content of carrageenans was found to be significantly different between tissue-cultured and field-cultured *K. alvarezii* with  $34.2 \pm 10.9$  and  $7.5 \pm 6.7\%$ , respectively. Tissue culture is recommended to produce high quality seedlings by providing optimized culture conditions to the seaweed. This approach can serve as an alternative way to solve the seedling shortage problems currently faced by the seaweed industry.