Optimization of Carrageenan Extraction from *Eucheuma Spinosum* Using Pilot Scale Ohmic Technology

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Abstract:

Carrageenans are important hydrocolloids extracted from red seaweeds (Rhodophyceae) of genus *Eucheuma*, *Iridiae*, *Gigartina*, and *Chondrus*. Carrageenan extraction technologies currently applied in modern industries are based on conventional heating using double-jacketed tanks supplied with steam as heating medium. This technology is inefficient in energy use and poses a complicated processing setup since it requires a dedicated steam generator and steam delivery system. The objectives of this study were to test the performance of ohmic-based technology for carrageenan extraction and to find optimum conditions for extraction of carrageenan from *Eucheuma spinosum* using ohmic heating technology. The experiment was conducted using a 7.5 liter ohmic heating chamber. The experiment was designed using central composite design (CCD) of Response Surface Methodology (RSM) with four parameters (heating temperature, extraction time, KOH concentration, and seaweed to solution ratio) and the responses measured were carrageenan yield, viscosity, and gel strength. The experimental results showed that extraction yields and gel strength generally increased as both temperature and extraction time was increased. Optimum extraction condition was obtained at 88.1°C, extraction duration at 163.5 min, KOH concentration at 0.4M, and seaweed to solution ratio (w/v) at 1:36.1. The responses at the optimum conditions were carrageenan yield 52.27%, gel strength 62.46 Bloom, and viscosity 274.5 cP.

Keywords: carrageenan extraction, *Eucheuma spinosum*, ohmic technology