

CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME II

Editors:

Ibrahim Ali Noorbatcha
Hamzah Mohd. Salleh
Mohamed Elwathig Saeed Mirghani
Raha Ahmad Raus



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CHAPTER 36

PRODUCTION OF CARRAGEENAN FROM MALAYSIAN SEAWEED

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ABSTRACT

Two major red seaweed species available locally in Malaysia (in the coastal area of Sabah) which are *Kappaphycus alvarezii* and *Eucheuma denticulatum* were tested to the effect of alkali treatments on the yield and gel strength (quality) of the carrageenans which were collected from the different coastal areas of Sabah. They were analyzed using different alkali concentrations, temperatures and treatment times. For the screening stage of the agar, all samples were treated at set alkali treatment condition which at KOH concentration (5% w/v), temperature (85°C) and treatment time (90min). All samples were then will be subjected to hot water extraction (phosphate buffer solution at pH 7.2) at constant parameter of 95°C temperature and 1 hour extraction time. Carrageenan percentage yields value were for *Eucheuma denticulatum*, 55.9 % yield, *Kappaphycus alvarezii* collected from Semporna, 61.5 % yield and *Kappaphycus alvarezii* collected from Kota Kinabalu, 37.5 % yield. Based on the highest yield of carrageenan, *Kappaphycus alvarezii* collected from Semporna been chosen for the next stage of optimization where this species been subjected to different condition of parameters which are KOH concentration (2.0-6.0%), temperature (65-95°C) and treatment time (10-120min). The optimal conditions are those providing the highest gel strength (tested by using texture analyzer TA-XT plus). In this stage the highest gel strength was 659.13 g/cm² at condition of 6% w/v KOH concentration, 80°C temperature and 65 min extraction time.

Keywords: Seaweed, carrageenan, gel strength, *Kappaphycus alvarezii*, *Eucheuma denticulatum*.

INTRODUCTION

Carrageenan is a gel forming and viscosifying polysaccharides that are obtained by extraction of certain species in the class of red seaweeds or Rhodophyceae. Most of today's carrageenan productions are from the species of *Kappaphycus* (*Kappaphycus alvarezii*) and *Eucheuma* (*Eucheuma cottonii*, *Eucheuma denticulatum* and *Eucheuma spp.*) which contribute to the source of kappa and iota type of carrageenan respectively (McHugh, 2003). According to FAO (Food and Agricultural Organization of the United Nation) statistic, by 2005 nearly 92