

RINGKASAN

SITI NATASYAH. Optimasi dan Analisis Fisiko-Kimia Karagenan *Kappaphycus alvarezii* Menggunakan Material *Bead mill Stainless steel*. Dibimbing oleh SRI NOVALINA A dan AIDIL FADLI ILHAMDY.

Salah satu alternatif teknologi yang sedang dikembangkan dalam proses ekstraksi karagenan adalah penggunaan metode *bead mill*. *Bead mill* yang digunakan berbahan *stainless steel*, dengan kemampuan mendisintegrasi struktur sel secara efektif untuk meningkatkan efisiensi ekstraksi. Penelitian ini bertujuan untuk mengevaluasi efektivitas metode *bead mill stainless steel*, menentukan konsentrasi optimal, serta membandingkan karakteristik fisikokimia karagenan rumput laut *K. alvarezii* asal Kabupaten Karimun dan Kabupaten Lingga. Penelitian dilakukan 3 tahap, tahap pertama pembuatan bubur rumput laut dengan variasi konsentrasi 2%, 2.4%, 2.8%, dan 3.2% (b/v), tahap kedua yaitu proses ekstraksi rumput laut dan *centrifuge* dengan kecepatan 400 rpm selama 40 menit, tahap terakhir pengeringan karagenan dengan suhu 50°C selama 24 jam. Dari hasil penelitian didapatkan perlakuan terbaik dari sampel Kabupaten Karimun yaitu rendemen 39.5%, kadar air 7.73%, kadar abu 11.60%, kadar abu tidak larut asam 0.49%, kekuatan gel 158.35 g/cm², pH 7.6, viskositas 104 cP, logam berat arsen 6.15 mg/kg, merkuri 0.06 mg/kg, kadmium 1.67 mg/kg, dan timbal 1.39 mg/kg. Hasil dari perlakuan terbaik sampel Kabupaten Lingga yaitu rendemen 47.7%, kadar air 11.52%, kadar abu 8.52%, kadar abu tidak larut asam 0.43%, kekuatan gel 144.3 g/cm², pH 7.7, viskositas 95.3 cP, logam berat arsen 4.26 mg/kg, merkuri 0.02 mg/kg, kadmium 1.43 mg/kg, timbal 0.89 mg/kg. Ekstraksi menggunakan *bead mill stainless steel* terbukti efektif meningkatkan rendemen karagenan. Perlakuan terbaik diperoleh oleh perlakuan K1 dari kedua jenis karagenan, meskipun kandungan arsennya masih melebihi ambang batas maksimal.

Kata kunci: *Bead mill*, Fisikokimia, Karagenan, *Kappaphycus alvarezii*, *Stainless steel*

SUMMARY

SITI NATASYAH. Optimization and Physico-Chemical Analysis of *Kappaphycus alvarezii* Carrageenan Using Stainless steel Bead mill Material. Supervised by SRI NOVALINA A and AIDIL FADLI ILHAMDY.

One of the technological alternatives being developed in the carrageenan extraction process is the use of the bead mill method. The bead mill used is made of stainless steel, with the capability to effectively disintegrate cell structures to improve extraction efficiency. This study aims to evaluate the effectiveness of the stainless steel bead mill method, determine the optimal concentration, and compare the physicochemical characteristics of carrageenan from *K. alvarezii* seaweed originating from Karimun Regency and Lingga Regency. The study was conducted in three stages, the first stage was the preparation of seaweed pulp with concentration variations of 2%, 2.4%, 2.8%, and 3.2% (w/v), the second stage was the seaweed extraction and centrifugation process at a speed of 400 rpm for 40 minutes, and the final stage was drying the carrageenan at a temperature of 50°C for 24 hours. From the research results, the best treatment from the Karimun Regency sample showed a yield of 39.5%, moisture content of 7.73%, ash content of 11.60%, acid-insoluble ash of 0.49%, gel strength of 158.35 g/cm², pH of 7.6, viscosity of 104 cP, heavy metals arsenic 6.15 mg/kg, mercury 0.06 mg/kg, cadmium 1.67 mg/kg, and lead 1.39 mg/kg. The best treatment results for the Lingga Regency sample were a yield of 47.7%, moisture content of 11.52%, ash content of 8.52%, acid-insoluble ash of 0.43%, gel strength of 144.3 g/cm², pH of 7.7, viscosity of 95.3 cP, heavy metals arsenic 4.26 mg/kg, mercury 0.02 mg/kg, cadmium 1.43 mg/kg, and lead 0.89 mg/kg. Extraction using a stainless steel bead mill has proven effective in increasing carrageenan yield. The best treatment was obtained by the K1 treatment from both types of carrageenan, although its arsenic content still exceeded the maximum threshold.

Keywords: Bead mill, carrageenan, Kappaphycus alvarezii, physicochemical, stainless steel