

ANALISIS CEMARAN FISIK, KIMIA, DAN MIKROBIOLOGI PADA RUMPUT LAUT KERING YANG BERASAL DARI INDONESIA

INTISARI

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Rumput laut merupakan salah satu komoditas hasil perikanan yang potensial di Indonesia. Sebagian besar produksi rumput laut di Indonesia diekspor dalam kondisi kering dan sisanya digunakan sebagai bahan baku karagenan, agar-agar, bahan baku kosmetik, dan pakan. Penelitian ini bertujuan untuk mengetahui cemaran fisik, kimia, dan mikrobiologis pada rumput laut kering yaitu *Eucheuma cottonii*, *Eucheuma spinosum*, dan *Gracilaria* yang berasal dari Indonesia.

Hasil pengujian menunjukkan jumlah cemaran fisik (*impurities* kasar) pada sampel rumput laut kering sampel sebesar 0,076 – 6,32%. Jumlah cemaran kimia (logam berat) pada rumput laut kering yakni: arsen (As) (0,15 – 6,09 mg/kg); kadmium (Cd) (0,07 – 0,92 mg/kg); merkuri (Hg) (0,01 mg/kg); timbal (Pb) (0,10 – 2,26 mg/kg); dan timah (Sn) tidak ditemukan pada sampel. Hasil pengujian menunjukkan jumlah cemaran mikrobiologis pada sampel yaitu: Angka Lempeng Total (ALT) (10^2 – 10^6 koloni/gram); *Coliform* (9,2 – 240 APM/gram); seluruh sampel negatif bakteri *Escherichia coli*; 30% sampel tercemar bakteri *Staphylococcus aureus* ($0,43 \times 10^2$ – $11,1 \times 10^2$ CFU/ml); seluruh sampel negatif bakteri *Salmonella*; 10% sampel terduga positif *Vibrio cholerae*; 10% sampel memiliki cemaran angka kapang khamir ($3,1 \times 10^4$ koloni/gram) dengan cemaran *Aspergillus flavus* dan *Aspergillus parasiticus* (2×10^2 – $3,9 \times 10^4$ koloni/gram). Jumlah cemaran logam berat pada sampel melebihi peraturan yang telah ditetapkan pada SNI 2690:2015 tentang rumput laut kering dan cemaran mikrobial juga tergolong tinggi berdasarkan standar cemaran mikrobiologis yang telah ditetapkan oleh *European Food Safety Authority* dan regulasi negara China. Berdasarkan hasil pengujian cemaran fisik dan kimia pada studi ini direkomendasikan adanya perbaikan budidaya dan pengolahan pasca panen rumput laut serta perlunya penambahan persyaratan mutu mikrobiologis pada SNI rumput laut kering.

Kata kunci: rumput laut kering, *Eucheuma cottonii*, *Eucheuma spinosum*, *Gracilaria*, *impurities* kasar, cemaran logam berat, cemaran mikrobiologis

PHYSICAL, CHEMICAL, AND MICROBIOLOGICAL ANALYSIS OF DRIED SEAWEED FROM INDONESIA

ABSTRACT

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Seaweed is one of the potential fishery commodities in Indonesia. Most of the seaweed production in Indonesia is exported in dry conditions, and the rest is used as raw material for carrageenan, gelatin, cosmetic materials, and feed materials. This study aims to determine dried seaweed's physical, chemical, and microbiological contamination. The types of dried seaweed used were *Eucheuma cottonii*, *Eucheuma spinosum*, and *Gracilaria* from Indonesia.

The result showed that dried seaweed's physical impurities (crude impurities) ranged from 0.076% to 6.32%. The ranges of chemical contaminants (heavy metals) in dried seaweed were arsenic (0.15 – 6.09 mg/kg); cadmium (0.07 – 0.92 mg/kg); mercury (0.01 mg/kg); and lead (0.10 – 2.26 mg/kg); while tin was not found in dried seaweed. While the microbiological contamination in dried seaweed, namely Total Plate Number (ALT), ranged from 10^2 to 10^6 colonies/gram; *Coliform* ranged from 9.2 to 240 APM/gram; all samples were negative for *Escherichia coli*; 30% of samples were contaminated with *Staphylococcus aureus* bacteria in the range of 0.43×10^2 to 11.1×10^2 CFU/ml; all samples were negative for *Salmonella* bacteria; suspected positive *Vibrio cholerae* in 10% of samples; 10% of the samples had a yeast number of 3.1×10^4 colonies/gram; *Aspergillus flavus* and *Aspergillus parasiticus* contamination in the range of 2×10^2 to 3.9×10^4 colonies/gram. The amount of heavy metal contamination in dried seaweed exceeded the regulations set out in SNI 2690: 2015. The amount of microbial contamination was also high, exceeding microbiological contamination standards set by the European Food Safety Authority and Chinese regulations. Based on the physical and chemical contamination tests on dried seaweed in this study, it is recommended to improve seaweed cultivation and post-harvest processing and adding microbiological parameters to SNI dried seaweed.

Keywords: dried seaweed, *Eucheuma cottonii*, *Eucheuma spinosum*, *Gracilaria*, crude impurities, heavy metal contamination, microbiological contamination