

RINGKASAN

SONETA ACHMADIYAH. Hubungan Parameter Lingkungan Terhadap Kandungan Nitrat dan Fosfat Pada Sedimen Mangrove Kawasan Timur Laut Pulau Dompak. Dibimbing oleh CHANDRA JOEI KOENAWAN dan R. FATHUL RAHMAN.

Penelitian ini bertujuan untuk menganalisis kandungan nitrat dan fosfat serta mengkaji hubungan parameter lingkungan terhadap kandungan nitrat dan fosfat pada sedimen mangrove di Kawasan Timur Laut Pulau Dompak, Provinsi Kepulauan Riau. Penelitian ini dilatarbelakangi oleh meningkatnya aktivitas domestik di wilayah pesisir yang berpotensi meningkatkan masukan nutrisi ke ekosistem mangrove dan memicu eutrofikasi. Penelitian menggunakan pendekatan kuantitatif dengan metode deskriptif-korelasional. Pengambilan sampel sedimen dilakukan menggunakan metode purposive sampling pada 15 titik pengamatan yang mewakili kondisi lingkungan di lokasi penelitian. Parameter lingkungan yang diukur meliputi dissolved oxygen (DO), suhu, pH, dan oxidation-reduction potential (ORP), sedangkan data kecepatan arus, arah arus, dan pasang surut diperoleh dari Copernicus Marine Service dan Badan Informasi Geospasial (BIG). Analisis kandungan nitrat dilakukan menggunakan metode SNI 06-2480-1991, sedangkan fosfat dianalisis berdasarkan metode AOAC (2000). Data dianalisis menggunakan uji normalitas Shapiro-Wilk dan uji korelasi Spearman. Hasil penelitian menunjukkan bahwa kandungan nitrat pada sedimen berkisar antara 2,320–154,450 mg/kg, sedangkan kandungan fosfat berkisar antara 51,750–147,850 mg/kg, yang menunjukkan adanya variasi konsentrasi nutrisi antar titik pengamatan. Hasil uji normalitas menunjukkan bahwa data nitrat ($p < 0,001$) dan fosfat ($p = 0,002$) tidak berdistribusi normal sehingga analisis hubungan dilakukan menggunakan uji korelasi Spearman. Hasil analisis menunjukkan bahwa parameter lingkungan berupa DO, suhu, pH, dan ORP tidak memiliki hubungan yang signifikan terhadap kandungan nitrat maupun fosfat pada sedimen ($p > 0,05$). Variasi kandungan nitrat dan fosfat diduga lebih dipengaruhi oleh faktor lain di luar parameter lingkungan yang diuji, seperti masukan limbah antropogenik dan proses biogeokimia sedimen. Hasil penelitian ini diharapkan dapat menjadi data dasar dalam pengelolaan ekosistem mangrove serta mendukung penyusunan kebijakan pengelolaan wilayah pesisir secara berkelanjutan di Kawasan Timur Laut Pulau Dompak.

Kata kunci: Fosfat, Nitrat, Parameter Lingkungan, Pulau Dompak, Sedimen Mangrove.

SUMMARY

SONETA ACHMADIYAH. Relationship Between Environmental Parameters and Nitrate and Phosphate Concentrations in Mangrove Sediments of the Northeastern Area of Dompak Island. Supervised by CHANDRA JOEI KOENAWAN and R. FATHUL RAHMAN.

This study aimed to analyze nitrate and phosphate concentrations and examine the relationship between environmental parameters and nitrate and phosphate concentrations in mangrove sediments in the northeastern area of Dompak Island, Riau Islands Province. The study was motivated by the increasing domestic activities in coastal areas, which have the potential to increase nutrient inputs into mangrove ecosystems and trigger eutrophication. A quantitative approach with a descriptive-correlational method was employed. Sediment samples were collected using a purposive sampling method at 15 observation stations representing the environmental conditions of the study area. The environmental parameters measured included dissolved oxygen (DO), temperature, pH, and oxidation-reduction potential (ORP), while current velocity, current direction, and tidal data were obtained from Copernicus Marine Service and the Geospatial Information Agency (BIG). Nitrate concentrations were analyzed using the Indonesian National Standard (SNI) 06-2480-1991 method, whereas phosphate concentrations were determined based on the AOAC (2000) method. Data were analyzed using the Shapiro-Wilk normality test and Spearman's rank correlation test. The results showed that nitrate concentrations in the sediment ranged from 2.320 to 154.450 mg/kg, while phosphate concentrations ranged from 51.750 to 147.850 mg/kg, indicating variations in nutrient concentrations among the observation stations. The normality test indicated that the nitrate ($p < 0.001$) and phosphate ($p = 0.002$) data were not normally distributed; therefore, the relationships were analyzed using Spearman's rank correlation test. The results revealed that the environmental parameters, including dissolved oxygen (DO), temperature, pH, and oxidation-reduction potential (ORP), did not show significant correlations with nitrate or phosphate concentrations in the sediment ($p > 0.05$). The observed variations in nitrate and phosphate concentrations were likely influenced by factors other than the measured environmental parameters, such as anthropogenic waste inputs and sediment biogeochemical processes. The findings of this study are expected to provide baseline data for mangrove ecosystem management and support the development of sustainable coastal management policies in the northeastern area of Dompak Island.

Keywords: Dompak Island, Environmental Parameters, Mangrove Sediments, Nitrate, Phosphate.