ABSTRAK

Pencemaran logam berat di perairan laut menjadi ancaman serius bagi lingkungan dan ekosistem yang hidup didalamnya, terutama dari logam kadmium (Cd) dan timbal (Pb). Penelitian ini dilakukan di Perairan Kaliapanas, Cilacap, yang merupakan wilayah strategis dengan berbagai aktivitas antropogenik seperti industri dan aktivitas domestik. Penelitian ini bertujuan mengkaji distribusi, pengaruh variabel fisika-kimia perairan, dan status pencemaran logam berat di Perairan Kalipanas, Cilacap. Sampel air diambil dari tiga stasiun antara lain *outlet* Sungai Donan (stasiun 1), Kawasan mangrove (stasiun 2) dan Perairan Kaliapanas (stasiun 3) menggunakan *purposive sampling*, yang mewakili lokasi dengan intensitas aktivitas industri, domestik, dan transportasi laut yang berbeda. Analisis konsentrasi logam Cd dan Pb dalam kolom air dilakukan menggunakan alat *Atomic Absorption Spectrophotometer* (AAS). Hasil penelitian menunjukkan konsentrasi Cd berkisar antara 0,002-0,004 mg/L dan Pb sebesar 0,006 mg/L. Distribusi logam berat bervariasi di setiap stasiun, dengan konsentrasi tertinggi ditemukan di stasiun dekat sumber pembuangan limbah industri. Analisis korelasi menunjukkan bahwa variabel fisika-kimia seperti suhu, TSS, pH, dan arus air memiliki pengaruh signifikan terhadap konsentrasi logam Cd dan Pb dalam kolom air. Status pencemaran perairan berdasarkan metode analisis Indeks Pencemaran (IP) mengindikasikan Perairan Kalipanas berada dalam kategori tercemar ringan.

Kata kunci: *Logam Berat, Pencemaran, Timbal, Kadmium, Cilacap.*

ABSTRACT

Heavy metal pollution in marine waters was a serious threat to the environment and ecosystems within it, particularly due to cadmium (Cd) and lead (Pb) contamination. This study was conducted in Kaliapanas Waters, Cilacap, a strategic area with various anthropogenic activities, including industrial and domestic activities. The aim of this study was to assess the distribution of heavy metals, the influence of physical and chemical water variables, and the pollution status of heavy metals in Kaliapanas Waters, Cilacap. Water samples were collected from three stations: the Donan River outlet (station 1), the mangrove area (station 2), and Kaliapanas Waters (station 3) using purposive sampling, representing locations with different intensities of industrial, domestic, and marine transportation activities. The concentration of Cd and Pb in the water column was analyzed using an Atomic Absorption Spectrophotometer (AAS). The results showed that Cd concentration ranged from 0.002-0.004 mg/L, while Pb concentration was 0.006 mg/L. The distribution of heavy metals varied across stations, with the highest concentrations found near industrial waste disposal sources. Correlation analysis indicated that physical and chemical variables such as temperature, TSS, pH, and water currents significantly influenced Cd and Pb concentrations in the water column. The pollution status, assessed using the Pollution Index (PI) method, indicated that Kaliapanas Waters fell into the lightly polluted category.

***Keywords**: Heavy Metals, Pollution, Lead, Cadmium, Cilacap.*

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