

## KORELASI ANTARA KEANEKARAGAMAN DAN KEMELIMPAHAN FITOPLANKTON DENGAN EFEKTIVITAS ABSORPSI LOGAM BERAT KADMIUM (Cd) DI PERAIRAN TANJUNG MAS, SEMARANG

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### INTISARI

Pelabuhan Tanjung Mas merupakan dermaga yang berlokasi di Teluk Semarang dan menjadi pusat pertumbuhan utama Jawa Tengah. Kandungan logam berat kadmium (Cd) di perairan Teluk Semarang melebihi baku mutu air. Reduksi polutan logam berat kadmium (Cd) dapat dilakukan dengan bioremediasi *in-situ* menggunakan fitoplankton karena jumlahnya melimpah di alam dan mengabsorpsi banyak Cd. Penelitian ini dilakukan bertujuan untuk menentukan keanekaragaman dan kemelimpahan fitoplankton di Tanjung Mas, mempelajari efektivitas absorpsi Cd pada fitoplankton di Tanjung Mas secara *in-situ* dengan interval waktu 24, 48, dan 72 jam, serta untuk mempelajari korelasi antara variabel kemelimpahan dengan variabel efektivitas absorpsi kadmium. Metode pengambilan sampel fitoplankton adalah *purposive random sampling*. Pengukuran konsentrasi Cd pada sampel air dan fitoplankton dengan *Atomic Absorption Spectrophotometer* (AAS). Pengujian dilakukan dengan interval waktu 0 jam, 24 jam, 48 jam, dan 72 jam. Kemelimpahan fitoplankton di Perairan Tanjung Mas secara keseluruhan menunjukkan kisaran antara 393–1.258 individu/l, indeks keanekaragaman ( $H'$ ) sebesar 1,167–2,055, indeks keseragaman ( $E$ ) sebesar 0,522–0,827, dan indeks dominansi ( $C$ ) kisaran 0,176–0,464. Absorpsi Cd oleh fitoplankton di perairan Tanjung Mas, Semarang paling efektif pada interval waktu 72 jam. Kemelimpahan pada fitoplankton tidak menunjukkan korelasi terhadap efektivitas absorpsi Cd. Adanya dominansi suatu genus di stasiun penelitian menunjukkan korelasi moderat terhadap efektivitas absorpsi pada interval waktu 24 jam dan korelasi lemah pada interval waktu 48 dan 72 jam. Populasi yang paling mendominasi komunitas fitoplankton di Tanjung Mas adalah *Chaetoceros* sp., sehingga genus ini berperan tinggi sebagai bioremediator logam berat kadmium secara *in-situ* di perairan Tanjung Mas, Semarang.

**Kata kunci:** bioremediasi *in-situ*, kadmium, keanekaragaman fitoplankton, kemelimpahan fitoplankton, Tanjung Mas.

## CORRELATION BETWEEN PHYTOPLANKTON DIVERSITY AND ABUNDANCE TO ABSORPTION EFFECTIVITY OF HEAVY METAL CADMIUM (Cd) IN TANJUNG MAS, SEMARANG

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### ABSTRACT

Tanjung Mas port was located on Semarang bay. This area had rapid development and became the main population growth in Central Java. The heavy metal cadmium (Cd) in Semarang bay exceeds the water quality standard. Its concentration would be reduced by *in-situ* bioremediation using phytoplankton because it was abundant in nature and could absorb Cd in large amounts. The research was conducted to determine phytoplankton abundance and diversity in Tanjung Mas, to study absorption effectiveness of phytoplankton in Tanjung Mas directly in 24, 48, and 72 hours, and to study both correlation. Phytoplankton collection method in this research used purposive random sampling. Measurement of the Cd concentration in water and phytoplankton samples was done with the Atomic Absorption Spectrophotometer (AAS). The concentration of Cd in phytoplankton was also measured for 0 hour, 24 hours, 48 hours, and 72 hours. The result of this research showed that abundance of phytoplankton was about 393–1,258 organism/l, diversity index ( $H'$ ) showed 1.167–2.055, similarity index (E) was 0.522–0.827, and dominance index was 0.176–0.464. Absorption of Cd used phytoplankton in Tanjung Mas more efficiently in 72 hours. Abundance was not correlated to effectiveness. Genus dominance in the research station showed moderate correlation to bioremediation effectiveness. Dominant population in this phytoplankton community was *Chaetoceros* sp. Therefore, this genus had a big role as *in-situ* bioremediation in Tanjung Mas, Semarang.

**Keywords:** cadmium, *in-situ* bioremediation, phytoplankton abundance, phytoplankton diversity, Tanjung Mas.