

RINGKASAN

OCTAVIA VERONICA PANJAITAN. Hubungan Tekstur Sedimen Terhadap Distribusi Karbon Sedimen di Perairan Teluk Riau. Dibimbing oleh CHANDRA JOEI KOENAWAN dan R. FATHUL RAHMAN.

Sedimen pesisir berperan krusial sebagai media penyimpanan karbon organik untuk mitigasi perubahan iklim global, namun sebarannya sangat dinamis akibat tekanan antropogenik. Penelitian ini bertujuan untuk mengidentifikasi karakteristik tekstur sedimen serta menganalisis hubungan dan peran fraksi sedimen dalam mengontrol distribusi karbon sedimen di Teluk Riau. Penelitian dilaksanakan pada April hingga Juni 2026 di perairan Teluk Riau, Kota Tanjungpinang. Alat dan bahan utama yang digunakan meliputi *core sampler*, GPS, multi-tester kualitas air, ayakan bertingkat standar internasional, oven, tanur (*furnace*), neraca analitik, serta sampel sedimen permukaan perairan. Prosedur penelitian diawali dengan survei lapangan menggunakan metode *purposive sampling* pada 9 stasiun pengamatan untuk mengambil sedimen permukaan kedalaman 0–5 cm dan mengukur parameter lingkungan secara *in situ*. Analisis data tekstur sedimen dilakukan melalui teknik pengayakan kering (*dry sieving*) berdasarkan sistem Wentworth (1922). Sementara itu, analisis kandungan karbon organik (%C-organik) dihitung menggunakan metode *Loss on Ignition* (LOI) pada suhu 550 °C. Uji prasyarat statistik Shapiro-Wilk diterapkan sebelum melakukan analisis hubungan linear menggunakan uji korelasi Pearson melalui *software* Jamovi. Hasil pengamatan menunjukkan karakteristik tekstur sedimen Teluk Riau bersifat heterogen yang terbagi atas tipe pasir, pasir berlumpur, dan lumpur berpasir. Persentase fraksi pasir mendominasi dengan rata-rata 64,56% ($r = 0,448$), sedangkan fraksi lumpur sebesar 35,44% ($r = -0,448$). Namun, hubungan kedua variabel dengan %C-organik dinyatakan tidak signifikan secara statistik ($p > 0,05$). Kesimpulan penelitian menegaskan bahwa karakteristik fisik tekstur sedimen secara alami tidak memberikan pengaruh langsung yang mutlak terhadap sebaran karbon organik di Teluk Riau. Distribusi dan akumulasi karbon sedimen di kawasan pesisir ini lebih kuat dikontrol oleh pasokan material organik eksternal akibat tingginya aktivitas antropogenik (pemukiman, hotel, pasar, galangan kapal) serta pengaruh dinamis hidrodinamika arus air dan pasang surut setempat.

Kata kunci: Karbon Organik, Loss on Ignition (LOI), Sedimen, Teluk Riau, Tekstur Sedimen

SUMMARY

OCTAVIA VERONICA PANJAITAN. The Relationship Between Sediment Texture and Sediment Carbon Distribution in the Waters of Riau Bay. Advised by CHANDRA JOEI KOENAWAN and R. FATHUL RAHMAN.

Coastal sediments are an important reservoir of organic carbon for climate change mitigation, but their distribution is susceptible to change due to human activities. This study aims to identify the textural characteristics of sediments and analyze the relationships and roles of sediment fractions in controlling carbon distribution in Riau Bay. The study was conducted from April to June 2026 in the waters of Riau Bay, Tanjungpinang City. The equipment and materials used included a core sampler, GPS, water quality multitester, standard graduated sieves, an oven, a furnace, an analytical balance, and sediment samples. The procedure began with a field survey using the purposive sampling method at nine observation stations to collect surface sediments (0–5 cm) and measure relevant environmental parameters. Sediment texture data were analyzed using the dry sieving method based on the Wentworth system (1922). Meanwhile, the organic carbon content (% organic C) was determined using the Loss on Ignition (LOI) method at a temperature of 550 °C. The Shapiro-Wilk statistical test was conducted to assess the data's normality before performing a linear relationship analysis using Pearson's correlation test via the Jamovi software. The results showed that the sediment texture in Riau Bay is heterogeneous, consisting of sand, silty sand, and sandy silt. The sand fraction dominates, with an average of 64.56% ($r = 0.448$), followed by the silt fraction at 35.44% ($r = -0.448$). However, hypothesis testing showed that the relationship between these two fractions and the percentage of organic carbon was not statistically significant ($p > 0.05$). The study's conclusion confirms that the physical characteristics of sediment texture do not, by themselves, have a direct and absolute effect on the distribution of organic carbon in Riau Bay. The distribution of organic carbon in this coastal area is more strongly influenced by the volume of waste generated by anthropogenic activities (residential areas, hotels, markets, shipyards) as well as the dynamic effects of local water currents and tides.

Keywords: Organic Carbon, Loss on Ignition (LOI), Sediments, Riau Bay, Sediment Texture