

Dany Aprilia Bungawati. 22.03.4.1.1.00074. Analisis Struktur Komunitas Fitoplankton Sebagai Penentu Tingkat Pencemaran Dengan Metode Indeks Saprobitas Di Pesisir Kamal, Madura. Pembimbing **Novi Indriyawati, S.Kel.,M.Si.**

ABSTRAK

Pesisir Kamal merupakan kawasan pesisir yang dipengaruhi oleh berbagai aktivitas antropogenik, seperti permukiman, transportasi laut, aktivitas nelayan, dan pembuangan limbah domestik yang berpotensi menurunkan kualitas perairan. Fitoplankton sebagai produsen primer dan bioindikator memiliki kemampuan sebagai penentu perubahan kondisi lingkungan melalui struktur komunitas dan indeks saprobitas. Penelitian ini bertujuan untuk menganalisis kelimpahan dan struktur komunitas fitoplankton, menentukan tingkat pencemaran berdasarkan Indeks Saprobitas (SI) serta menganalisis perbedaan kelimpahan fitoplankton antar waktu pengambilan sampel di Pesisir Kamal, Kabupaten Bangkalan. Penelitian dilaksanakan pada Januari–Februari 2026 di enam titik pengamatan menggunakan metode *purposive sampling*. Pengambilan sampel dilakukan pada waktu yang berbeda dengan kedalaman dan pasut yang berbeda pula. Identifikasi fitoplankton dilakukan menggunakan mikroskop binokuler Olympus CX43 dengan metode sensus menggunakan Sedgwick Rafter Counting Cell (SRC). Analisis data meliputi perhitungan kelimpahan, indeks keanekaragaman (H'), keseragaman (E), dominansi (C), Saprobitas Indeks (SI), Trofik Saprobitas Indeks (TSI), serta uji statistik One-Way ANOVA yang dilanjutkan dengan uji Tukey HSD. Hasil penelitian menunjukkan bahwa fitoplankton yang ditemukan didominasi oleh filum *Bacillariophyta*. Kelimpahan fitoplankton selama tiga minggu pengambilan sampel ditinjau dari tingkat kesuburan perairan masuk dalam kategori oligotrofik. Minggu pertama kelimpahan berkisar 10,5-42,5 ind/L, minggu kedua berkisar 62- 102,5 ind/L dan minggu ketiga berkisar 226-823 ind/L. Struktur komunitas yang terdiri dari keanekaragaman minggu pertama berkisar 1,889-2,520, minggu kedua berkisar 2,237-2,611, minggu ketiga 2,465-2,825 secara keseluruhan keanekaragaman dalam kategori sedang, keseragaman minggu pertama berkisar 0,803-1,054, minggu kedua berkisar 0,766-0,830, minggu ketiga berkisar 0,757-788 keseluruhan keseragaman dalam kategori tinggi dan dominansi minggu pertama berkisar 0,102-0,198, minggu kedua berkisar 0,118-0,158 minggu ketiga berkisar 0,088-0,140 keseluruhan dominansi berada dalam kategori rendah atau tidak ada spesies yang mendominasi. Hasil perhitungan Indeks saprobitas fitoplankton minggu pertama berkisar 0,500-0,667 minggu kedua berkisar 0,500-0,778 minggu ketiga berkisar 0,600-0,889. Secara keseluruhan tingkat pencemaran dalam kategori β/α mesosaprobitik atau tingkat pencemaran ringan hingga sedang. Hasil pengukuran parameter kualitas perairan menunjukkan bahwa suhu, salinitas, pH, oksigen terlarut (DO), arus, nitrat, dan BOD masih berada pada kisaran yang mendukung pertumbuhan fitoplankton, sedangkan konsentrasi fosfat melebihi batas toleransi pertumbuhan fitoplankton. Adapun hasil uji One Way Anova nilai sig. $>0,05$ sehingga tidak terdapat perbedaan yang signifikan antara titik lokasi dengan kelimpahan fitoplankton. Hasil uji One-Way ANOVA menunjukkan terdapat perbedaan yang signifikan antara kelimpahan dengan waktu pengambilan sampel yang berbeda dengan nilai Sig. $<0,05$ dan uji Tukey didapat bahwa seluruh pasangan minggu memiliki perbedaan nyata, dengan rata-rata kelimpahan tertinggi terjadi pada minggu ketiga.

Kata Kunci: fitoplankton, struktur komunitas, Saprobitas Indeks, kualitas perairan, pencemaran organik, Pesisir Kamal.

ABSTRACT

Kamal Coastal Waters are influenced by various anthropogenic activities, including residential settlements, marine transportation, fishing activities, and the discharge of domestic waste, all of which have the potential to degrade water quality. Phytoplankton, as primary producers and biological indicators, can be used to assess environmental changes through their community structure and saprobic index. This study aimed to analyze the abundance and community structure of phytoplankton, determine the level of water pollution based on the Saprobic Index (SI), and evaluate differences in phytoplankton abundance among different sampling periods in the coastal waters of Kamal, Bangkalan Regency. The study was conducted from January to February 2026 at six sampling stations using a purposive sampling method. Sampling was carried out at different times under varying water depths and tidal conditions. Phytoplankton identification was performed using an Olympus CX43 binocular microscope with the census method employing a Sedgwick Rafter Counting Cell (SRC). Data analysis included calculations of phytoplankton abundance, diversity index (H'), evenness index (E), dominance index (C), Saprobic Index (SI), Trophic Saprobic Index (TSI), and statistical analysis using One-Way Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) test. The results showed that the phytoplankton community was dominated by the phylum Bacillariophyta. Based on the trophic status of the waters, phytoplankton abundance throughout the three-week sampling period was classified as oligotrophic. During the first week, abundance ranged from 10.5–42.5 ind/L, increasing to 62.0–102.5 ind/L in the second week and 226–823 ind/L in the third week. The community structure analysis indicated that the diversity index (H') ranged from 1.889–2.520 in the first week, 2.237–2.611 in the second week, and 2.465–2.825 in the third week, indicating moderate diversity overall. The evenness index (E) ranged from 0.803–1.054 in the first week, 0.766–0.830 in the second week, and 0.757–0.788 in the third week, reflecting high evenness across all sampling periods. Meanwhile, the dominance index (C) ranged from 0.102–0.198 in the first week, 0.118–0.158 in the second week, and 0.088–0.140 in the third week, indicating low dominance, with no single species dominating the community. The phytoplankton Saprobic Index (SI) ranged from 0.500–0.667 in the first week, 0.500–0.778 in the second week, and 0.600–0.889 in the third week. Overall, the waters were classified as β/α -mesosaprobic, indicating slightly to moderately polluted conditions. Measurements of water quality parameters showed that temperature, salinity, pH, dissolved oxygen (DO), current velocity, nitrate, and biochemical oxygen demand (BOD) remained within ranges favorable for phytoplankton growth, whereas phosphate concentrations exceeded the tolerance threshold for optimal phytoplankton development. The results of the One-Way ANOVA showed no significant differences in phytoplankton abundance among sampling stations (Sig. > 0.05). However, significant differences were found among the different sampling periods (Sig. < 0.05). The subsequent Tukey HSD test revealed that all pairs of

sampling weeks differed significantly, with the highest mean phytoplankton abundance recorded during the third week.

Keywords: *phytoplankton, community structure, Saprobic Index, water quality, organic pollution, Kamal Coastal Waters.*