KARAKTERISASI KOMUNITAS BAKTERI INDIKATOR DAN KORELASINYA DENGAN KUALITAS AIR PADA KAWASAN PESISIR TAMBAK UDANG DI BALI

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ABSTRAK

Akumulasi limbah akuakultur udang berisiko memicu degradasi lingkungan dan wabah penyakit. Penelitian ini bertujuan untuk mengkarakterisasi komunitas bakteri indikator di kawasan pesisir sekitar tambak udang Desa Penyabangan, serta mengevaluasi korelasinya dengan parameter kualitas air. Metode penelitian yang digunakan adalah deskriptif kuantitatif dengan teknik *purposive sampling* pada lima titik stasiun pada musim kemarau (Agustus) dan musim penghujan (Desember). Metode kultivasi konvensional digunakan pada media selektif, yaitu (TCBSA), (PIA), dan *Marine Agar*. Parameter kualitas air dievaluasi berdasarkan PP No. 22 Tahun 2021, Indeks Pencemaran (IP), analisis korelasinya menggunakan *Spearman Correlation*. Hasil penelitian menunjukkan komunitas bakteri didominasi oleh *Vibrio* spp. dan *Pseudomonas* spp., dengan kelimpahan tertinggi di stasiun IPAL dan Outlet. Peningkatan kelimpahan bakteri pada musim kemarau dipicu oleh tingginya beban nutrien organik (Amonia 0,12–0,80 mg/L; Nitrat 0,011–0,018 mg/L; Nitrit 0,04–0,12 mg/L) yang melampaui baku mutu. Berdasarkan nilai IP (10,50–11,87), perairan berada pada status "Tercemar Berat" akibat limbah budidaya. Mitigasi yang direkomendasikan mencakup optimalisasi IPAL, efisiensi pakan, serta pemantauan kualitas air dan mikrobiologis secara berkala untuk menjaga keberlanjutan ekosistem pesisir.

Kata Kunci: Akuakultur Udang, Bakteri Indikator, Indeks Pencemaran, Kualitas Air, *Vibrio* spp.

CHARACTERIZATION OF INDICATOR BACTERIAL COMMUNITIES AND THEIR CORRELATION WITH WATER QUALITY IN THE COASTAL AREA OF SHRIMP PONDS IN BALI

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ABSTRACT

The accumulation of shrimp aquaculture waste poses a risk of environmental degradation and disease outbreaks. This study aimed to characterize indicator bacterial communities in the coastal area surrounding shrimp ponds in Penyabangan and evaluate their correlation with water quality parameters. Purposive sampling was conducted across five stations during the dry (August) and rainy (December) seasons. Conventional cultivation methods were applied using selective media, namely TCBSA, PIA, and Marine Agar. Water quality parameters were evaluated based on Government Regulation No. 22 of 2021 and the Pollution Index, while correlation analysis with Spearman's rank correlation. The results showed that the bacterial community was dominated by Vibrio spp. and Pseudomonas spp., with the highest abundance observed at the WWTP and Outlet stations. The increased bacterial abundance during the dry season was driven by high organic nutrient loads (Ammonia 0.12–0.80 mg/L; Nitrate 0.011–0.018 mg/L; Nitrite 0.04–0.12 mg/L) that exceeded water quality standards. Based on the PI values (10.50–11.87), the waters were classified as "Heavily Polluted" due to aquaculture waste. Recommended mitigation measures include optimizing WWTP operations, improving feeding efficiency, and conducting periodic water quality and microbiological monitoring to maintain coastal ecosystem sustainability.

Keywords: *Indicator Bacteria, Pollution Index, Shrimp Aquaculture, Water Quality, Vibrio spp.*