

**KARAKTERISASI KOMUNITAS BAKTERI DALAM
PENENTUAN STATUS KUALITAS AIR PADA KAWASAN
KERAMBA JARING APUNG**

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ABSTRAK

Aktivitas budidaya perikanan dengan sistem Keramba Jaring Apung (KJA) di Desa Sumberkima, Bali, menghasilkan limbah organik yang berpotensi memengaruhi daya dukung lingkungan. Penelitian ini bertujuan untuk mengidentifikasi karakteristik komunitas bakteri bioindikator (*Vibrio* sp. dan *Pseudomonas* sp.), mengevaluasi pengaruh kualitas air terhadap distribusinya, dan menentukan status mutu perairan berdasarkan parameter biologi dan fisik-kimia. Metode penelitian yang digunakan adalah deskriptif kuantitatif dengan teknik *purposive sampling* di enam stasiun pada musim kemarau dan penghujan. Analisis data menggunakan Indeks Pencemaran (IP), Indeks Keragaman *Shannon-Wiener* (H'), serta *Principal Component Analysis* (PCA). Hasil penelitian menunjukkan komunitas bakteri didominasi oleh genus *Vibrio* (44,1%) dan *Pseudomonas* (38,2%–41,9%), dengan kelimpahan tertinggi ditemukan di area *outlet* tambak dan zona inti KJA. Kondisi kualitas air secara signifikan memengaruhi struktur komunitas bakteri, di mana pada musim kemarau terjadi fenomena *overgrowth* *Vibrio* yang dipicu oleh peningkatan beban nutrisi Amonia (0,04 mg/L) dan Nitrat (0,013 mg/L). Berdasarkan metode IP, status mutu perairan secara umum berada pada kategori “Tercemar Ringan” (IP 0,94 – 1,28). Temuan ini mengindikasikan bahwa meskipun tingkat pencemaran masih berada dalam batas asimilasi moderat, namun proliferasi bakteri oportunistik menunjukkan adanya tekanan ekologis awal yang dapat meningkatkan risiko wabah vibriosis. Diperlukan langkah mitigasi berupa manajemen pemberian pakan yang efisien dan pemantauan mikrobiologis secara berkala untuk menjaga keberlanjutan sektor akuakultur di wilayah tersebut.

Kata Kunci: *Vibrio*, *Pseudomonas*, Kualitas Air, Indeks Pencemaran, KJA, Sumberkima

CHARACTERIZATION OF BACTERIAL COMMUNITIES IN DETERMINING WATER QUALITY STATUS IN FLOATING NET CAGE AREAS

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ABSTRACT

*Aquaculture activities using the Floating Net Cage (FNC) system in Sumberkima Village, Bali, generate organic waste that potentially affects the environmental carrying capacity. This study aims to identify the characteristics of bioindicator bacterial communities (*Vibrio* sp. and *Pseudomonas* sp.), evaluate the influence of water quality on their distribution, and determine the water quality status based on biological and physicochemical parameters. The research method employed was descriptive quantitative with a purposive sampling technique conducted at six stations during the dry and rainy seasons. Data analysis utilized the Pollution Index (PI), Shannon-Wiener Diversity Index (H'), and Principal Component Analysis (PCA). The results showed that the bacterial communities were dominated by the genera *Vibrio* (44.1%) and *Pseudomonas* (38.2%–41.9%), with the highest abundance found in pond outlet areas and the FNC core zone. Water quality conditions significantly influenced the structure of the bacterial community; specifically, during the dry season, *Vibrio* overgrowth occurred, triggered by increased nutrient loads of Ammonia (0.04 mg/L) and Nitrate (0.013 mg/L). Based on the PI method, the water quality status was generally categorized as “Lightly Polluted” (PI 0.94 – 1.28). These findings indicate that while the pollution level remains within a moderate assimilation limit, the proliferation of opportunistic bacteria signals early ecological pressure that increases the risk of vibriosis outbreaks. Mitigation measures, including efficient feed management and regular microbiological monitoring, are required to ensure the sustainability of the aquaculture sector in the region.*

Keywords: *Vibrio, Pseudomonas, Water Quality, Pollution Index, FNC, Sumberkima*