

Analisis Keragaman Bakteri Nitrifikasi Heterotropik pada Tambak Udang Vaname (*Litopenaeus vannamei*)

**Handang Widantara
21/476562/PMU/10740**

INTISARI

Mikroorganisme berperan penting dalam proses pemeliharaan kualitas air pada akuakultur. Manajemen kualitas air yang baik berpengaruh terhadap produktivitas budidaya udang. Studi tentang keragaman mikroorganisme yang berperan pada proses oksidasi amonia bermanfaat sebagai acuan dalam pengelolaan kondisi lingkungan tambak agar tetap produktif. Penelitian ini bertujuan untuk mengkaji keragaman komunitas bakteri pada tambak udang produktif, dan keragaman komunitas bakteri yang berperan dalam oksidasi amonia pada tambak udang tersebut. Penelitian ini dilaksanakan di dua tambak udang produktif di wilayah Kulon Progo dan Kebumen. Tambak udang tersebut dalam kondisi sehat berdasarkan indikator sintasan udang 78,8-81,4%, produksi udang 2,58-3,30 kg/m², kualitas air yang sesuai, dan tidak ada kasus penyakit. Mikrobioma diperoleh dengan ekstraksi DNA pada sampel hasil filtrasi (ukuran filter 0,22 µm) 200 ml sampel air, 1 gram sedimen, serta 200 ml sampel air hasil pengkayaan pada medium nitrifikasi. Analisis 16S rRNA *amplicon metagenomics sequencing* dan prediksi fungsi mikroba dilakukan pada semua mikrobioma sampel. Hasil penelitian menunjukkan bahwa komposisi mikrobioma pada sampel air dan sedimen pada kedua lokasi didominasi oleh filum Proteobacteria, Bacteroidota, Firmicutes, Actinobacteria dan Myxococcota. Komposisi mikrobioma yang berkontribusi terhadap oksidasi amonia didominasi oleh filum Proteobacteria, Bacteroidota dan Firmicutes, khususnya dari genus *Marinobacter*, *Thalassospira*, *Aeromonas*, *Acinetobacter*, *Rhizobium*, *Pseudomonas*, *Ochrobactrum*, *Flavobacterium*, *Sphingopyxis*, *Paracoccus*, dan *Stenotrophomonas*. Berdasarkan hal tersebut, dapat disimpulkan bahwa filum Proteobacteria, Bacteroidota, Actinobacteria, dan Firmicutes secara berurutan mendominasi tambak udang produktif dan sehat. Proses nitrifikasi pada tambak udang tersebut terutama diperankan 11 genera anggota Filum Proteobacteria dan Bacteroidota.

Kata Kunci: mikrobioma, penghilangan amonia, tambak udang produktif.

Diversity Analysis of Heterotrophic Nitrifying Bacteria in Vaname Shrimp (*Litopenaeus vannamei*) Ponds

**Handang Widantara
21/476562/PMU/10740**

ABSTRACT

Microorganisms in aquaculture play an important role in maintaining water quality related to ammonia. Good water quality management influences the productivity of shrimp farming. The study of the diversity of microorganisms that play a role in ammonia oxidation process is needed to manage the environmental conditions of ponds so that they remain productive. This study aimed to investigate the diversity of bacterial communities that play a role in ammonia oxidation process in productive intensive shrimp ponds. This study was conducted in two productive shrimp ponds in the Kulon Progo and Kebumen areas. The ponds were in a good condition, based on performance indicators, such as survival rate of 78.8-81.4%, production capacity of 2.58-3.30 kg/m², good water quality, and no disease cases. The microbiome was obtained by extracting DNA from filtered samples (0.22 µm pore size) of 200 ml water, 1 gram of sediment, and 200 ml of enrichment nitrification medium. 16S rRNA amplicon metagenomics sequencing analysis and microbial function prediction were performed on all microbiome samples. Results showed that the microbiome composition of water and sediment samples at both locations was dominated by Proteobacteria, Bacteroidota, Firmicutes, Actinobacteria, and Myxococcota phyla. The microbiome composition that contributes to ammonia oxidation was dominated by Proteobacteria, Bacteroidota, and Firmicutes, especially from the genera of *Marinobacter*, *Thalassospira*, *Aeromonas*, *Acinetobacter*, *Rhizobium*, *Pseudomonas*, *Ochrobactrum*, *Flavobacterium*, *Sphingopyxis*, *Paracoccus*, and *Stenotrophomonas*. It can be concluded that Proteobacteria, Bacteroidota, Actinobacteria, and Firmicutes dominate productive and healthy shrimp ponds, respectively. Eleven genera, the member of Proteobacteria and Bacteroidota play an important role in the nitrification process.

Keyword: microbiomes, ammonia removal, productive shrimp ponds.