

## ABSTRAK

PT Central Proteina Prima (CP Prima) merupakan perusahaan akuakultur besar di Indonesia yang membudidayakan udang vaname (*Litopenaeus vannamei*) menggunakan sistem semi-intensif dengan produktivitas tinggi. Namun, intensitas pemberian pakan yang tinggi memicu akumulasi limbah organik dan nitrogen anorganik seperti *Total Organic Matter* (TOM), amonium ( $\text{NH}_4^+$ ), dan nitrit ( $\text{NO}_2^-$ ), yang dapat menurunkan kualitas air tambak. Penelitian ini bertujuan mengevaluasi kesesuaian kualitas air terhadap SOP CP Prima serta menganalisis hubungan jumlah pakan dengan konsentrasi TOM,  $\text{NH}_4^+$ , dan  $\text{NO}_2^-$ . Metode yang digunakan adalah deskriptif kuantitatif dengan analisis grafik dan PCA (*Principal Component Analysis*) menggunakan software PAST 4.12. Pengambilan sampel dilakukan pada bulan Maret hingga Juni DOC 7-DOC 91 di petak kolam udang mitra binaan. Hasil penelitian menunjukkan bahwa selama DOC 7 hingga DOC 91, terjadi peningkatan signifikan kadar TOM (65–184 mg/L),  $\text{NH}_4^+$  (0.107–1.423 mg/L), dan  $\text{NO}_2^-$  (0.017–2.301 mg/L), terutama setelah DOC 30. Analisis PCA menunjukkan bahwa dua komponen utama menjelaskan 92,096% variansi data, dengan hubungan positif antara pakan, TOM, dan  $\text{NO}_2^-$ , serta negatif dengan  $\text{NH}_4^+$ . Korelasi Pearson menunjukkan hubungan sangat kuat dan signifikan antara pakan dan TOM ( $r = 0.924$ ), kuat dengan  $\text{NO}_2^-$  ( $r = 0.733$ ), namun sedang dan tidak signifikan dengan  $\text{NH}_4^+$  ( $r = 0.532$ ).

**Kata kunci:** Amonium ( $\text{NH}_4^+$ ); Kualitas air; Nitrit ( $\text{NO}_2^-$ ); Pakan; Total Organic Matter (TOM); Udang vaname.

## ABSTRACT

PT Central Proteina Prima (CP Prima) is a major aquaculture company in Indonesia that cultivates whiteleg shrimp (*Litopenaeus vannamei*) using a semi-intensive system with high productivity. However, the high intensity of feed application triggers the accumulation of organic waste and inorganic nitrogen compounds such as Total Organic Matter (TOM), ammonium ( $\text{NH}_4^+$ ), and nitrite ( $\text{NO}_2^-$ ), which can degrade pond water quality. This study aims to evaluate water quality compliance with CP Prima's Standard Operating Procedures (SOP) and to analyze the relationship between feed quantity and the concentrations of TOM,  $\text{NH}_4^+$ , and  $\text{NO}_2^-$ . The method used is a descriptive quantitative approach, with graphical analysis and Principal Component Analysis (PCA) conducted using PAST version 4.12 software. Sample collection was carried out from March to June, spanning DOC 7 to DOC 91, in shrimp pond units managed by partner farmers. The results showed that during the cultivation period from DOC 7 to DOC 91, there was a significant increase in TOM (65–184 mg/L),  $\text{NH}_4^+$  (0.107–1.423 mg/L), and  $\text{NO}_2^-$  (0.017–2.301 mg/L), especially after DOC 30. PCA results indicated that two principal components explained 92.096% of the total data variance, with a positive correlation between feed, TOM, and  $\text{NO}_2^-$ , and a negative correlation with  $\text{NH}_4^+$ . Pearson correlation analysis showed a very strong and significant relationship between feed and TOM ( $r = 0.924$ ), a strong correlation with  $\text{NO}_2^-$  ( $r = 0.733$ ), and a moderate but non-significant relationship with  $\text{NH}_4^+$  ( $r = 0.532$ ).

**Key words:** Ammonium ( $\text{NH}_4^+$ ); Water quality; Nitrite ( $\text{NO}_2^-$ ); Feed; Total Organic Matter (TOM); Whiteleg Shrimp.