

## POLLUTANT LOADINGS FROM EARTHEN SHRIMP POND DURING REGULAR WATER EXCHANGE

Dunging B.<sup>1\*</sup>, T.Y. Ling<sup>1</sup>, L. Nyanti<sup>1</sup>, Norhadi I.<sup>1</sup>, Justin J.J.E<sup>2</sup>

<sup>1</sup> Faculty of Resource Science and Technology, Universiti Malaysia Sarawak  
94300 Kota Samarahan, Sarawak

<sup>2</sup> Natural Resources and Environment Board, Sarawak, MALAYSIA

\* Corresponding author: dungingbuda@yahoo.com

### Abstract

Shrimp farming is an important source of foreign exchange for Sarawak. Stocking density, feeding rate and water exchange rate are factors that determine the pollutant loading into the adjacent river. However, little information is available on such loading in Sarawak. Therefore, the objective of this study was to determine the pollutant loadings from *Penaeus vannamei* and *Penaeus monodon* ponds during regular water exchange. In this study, samples were collected from earthen ponds with average stocking density of 32 pL/m<sup>2</sup> of *Penaeus monodon* and earthen pond of *Penaeus vannamei* with stocking density 124.4 pL/m<sup>2</sup> for three months to study the nutrients, total suspended solid (TSS), and chlorophyll-a loadings. NO<sub>3</sub>-N, NO<sub>2</sub>-N and NH<sub>3</sub>-N loadings were added up to calculate the dissolved inorganic nitrogen (DIN) loading. Regular water exchange started after eighty days of stocking with water exchange at the rate of 10 cm every alternate day until harvesting. Results shows that average DIN loading for *Penaeus vannamei* pond was 0.99±0.43 kg/day while PO<sub>4</sub>-P, total suspended solid (TSS) and chlorophyll-a loadings were 0.37±0.05 kg/day, 53.91±23.91 kg/day and 97.22±82.93 kg/day respectively. Averaged DIN, PO<sub>4</sub>-P, TSS and chlorophyll-a loading from *Penaeus monodon* pond within three months were 0.46±0.17 kg/day, 0.17±0.13 kg/day, 29.38±12.46 kg/day and 52.5±30.94 kg/day respectively. TSS, nutrients and chlorophyll-a loadings increased significantly over the culture period. The pond with higher stocking density produced higher pollutant concentrations and contributed higher amount of pollutant loadings. Regular water exchange from the ponds containing high TSS, nutrients and chlorophyll-a contributed high pollutants loadings and thus required extensive retention ponds to reduce the possible impact to the adjacent river system.

**Keywords:** earthen shrimp pond, dissolved inorganic nitrogen (DIN), water exchange, nutrient loadings

### 1.0 Introductions

Shrimp farms are usually built at the mangrove area where there is brackish tidal water. The farms required high water quality to provide a suitable environment for maximum growth of the stocked larvae. Feeding strategy, effluent problem mitigation, water exchanges, oxygenation and disease prevention are key factors that determine the