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Abstract

Shrimp pond sediment acts as organic matter pool and in turn supplying bio-available nutrients to the water column via decomposition of particulate matter. In this context, an interaction between water column and sediment in shrimp pond sediment is important. The objectives of the present study are to study the dissolved nutrient fluxes of inorganic phosphorus and nitrogen from different textures (clay and sand) of white shrimp pond sediments and to determine the role of environmental factors to control the fluxes. The samples of sediments were monthly collected throughout the culture period from 2 ponds of each type of shrimp pond bottom using sediment cores. The results indicated that sediment functions as source of dissolved inorganic phosphorus (DIP) and total ammonia nitrogen (TAN) which increased together with the culture period. The higher release fluxes were found in clay sediment with average of TAN and DIP 76.3 and 21.5 mg/m²/day while about 3.9.1 and 9.6 mg/m²/day were found in sandy sediment. NO$_3 ^-$ and NO$_2 ^-$ were absorbed by sediment which higher absorption of NO$_2 ^-$ in sandy sediment (-16.8 mg/m²/day) than clay sediment (-7.2 mg/m²/day), while NO$_3 ^-$ was absorbed by clay sediment (-45.8 mg/m²/day) which was higher than sandy sediment (-16.2 mg/m²/day). The difference of soil texture between clay and sandy sediments influences on fluxes, organic matter accumulation and also mineralization processes. The total fluxes of phosphorus and nitrogen from clay sediment were larger than sandy sediment. These differences are related to the relatively high availability of organic matter accumulation and decomposable organic matter in clay sediment compared to sandy sediment. The higher nitrogen removal from clay sediment by the coupled nitrification-denitrification was a key to control phytoplankton bloom by nitrogen limitation and also to improve water and sediment quality in shrimp pond.

Key words: sediment, phosphorus, nitrogen, flux, shrimp pond

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