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Nutrient removal using two species of mangrove (*Rhizophora mangle* and *Laguncularia racemosa*) in experimental shrimp (*Litopenaeus vannamei*) culture ponds

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The nutrient removal capacity of two species of mangrove (*Rhizophora mangle* and *Laguncularia racemosa*) was assessed in shrimp (*Litopenaeus vannamei*) culture ponds. One pond contained *R. mangle* seedlings and another *L. racemosa* seedlings, while a tirad (control pond) was left without seedlings. Treatment ponds contained 20 floating platforms with 720 mangrove seedlings. Water was pumped from the estuary into the ponds. Nutrient (NO_3^- , NO_2^- , NH_4^+ , and PO_4^{3-}) concentrations from the pond effluents were analyzed during the water exchange every 10 days. The results showed that *L. racemosa* removed 83.4% of dissolved inorganic nitrogen (DIN) and 45% of PO_4 and *R. mangle* removed 79% of DIN and 40% of PO_4 , while 30% of DIN and 23% of PO_4 was removed in the control pond. The flux of nutrients from the influent water to the ponds was 7269 g of N and 3095 g of P. In the ponds with mangroves, the nutrients were reduced to 1018–1071 g of N and 609–724 g of P. In the control pond, the effluent water nutrient concentrations were 5564 g of N and 1583 g of P. The nutrients accumulated in the mangrove tissue were 18,014–16,711 g of N and 5976–5832 g of P. Volatilization of ammonium and adsorption of phosphorus by sediments were 17,298–18,570 g of N and 6249–6268 g of P, and in the control pond, 30,022 g of N and 10,922 g of P, respectively. The final length for *L. racemosa* was 48 cm and the root length was 54 cm. For *R. mangle*, the final length was 38 cm and the root length was 46 cm. Shrimp survival was 70%, with individuals reaching 10.4 g in weight and 12.2 cm in length. We concluded that the nutrient removal percentage in ponds with mangrove seedlings was higher than in the pond without seedlings, improving water quality and reducing nutrients in the effluent.

Palabras clave: Nutrients, water quality, mangrove, hydroponic, aquaculture effluent

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