

Effluent from Royal LERD Wastewater Treatment Systems to Furnish Nutrients for Phytoplankton to Generate the Abundance of Hard Clam (*Meretrix* spp.) on Muddy Beach

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Abstract : The King's Royally Initiated Laem Phak Bia Environmental Research and Development Project ("the Royal LERD Project") is located in Laem Phak Bia Sub-District, Ban Laem District, Phetchaburi Province, Thailand. Phetchaburi municipal wastewater was treated with a simple technology by using aquatic plants, constructed wetland, oxidation ponds through a nature-by-nature process. The effluent from the Royal LERD Project was discharged into Laem Phak Bia muddy beach. The soil sediment samples were collected from two zones (200 and 600 meters from the coast of the beach), and tested for cation-exchange capacity (CEC), pH and organic matter and soil particles content. The marine water samples were also collected from the beach in wet and dry seasons and analyzed for its quality and compositions, including but not limited to, biochemical oxygen demand (BOD), dissolved oxygen (DO), suspended solids (SS), nutrients, heavy metals (As, Cd, Cr, Hg, and Pb), and phytoplankton at high and low tides. The soil texture was sandy loam with high concentration of calcium and magnesium which showed a property of base (pH 8). The marine water was qualified with the standard limits of coastal water quality. A dominant species was *Coscinodiscus* sp. It was found approximately 70.46% of total phytoplankton species in *Meretrix casta* gastrointestinal tract. The concentration of the heavy metals (As, Cd, Cr, Hg, Ni and Pb) in the tissues and water content of two species of hard clams indicated that heavy metals in *Meretrix casta* were higher than those in *Meretrix meretrix*. However, the heavy metals in both species were under the standard limits and safe for consumption. It can be concluded that nutrients in effluent from the wastewater treatment systems play important role in promoting the growth of phytoplankton and generating abundance of hard clams on muddy beach.

Keywords : wastewater, phytoplankton, hard clam (*Meretrix* spp.), muddy beach

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