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A preliminary evaluation of physiological filtration variables for *Crassostrea corteziensis* (Hertlein, 1951) and *Anadara tuberculosa* (Sowerby, 1833) in shrimp aquaculture effluents

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Abstract

This study examined the main filtration variables [filtration rate (*FR*), clearance rate (*CR*) and assimilation efficiency (*AE*)] of the Cortez oyster, *Crassostrea corteziensis* (Hertlein, 1951), and the mud cockle, *Anadara tuberculosa* (Sowerby, 1833), in shrimp aquaculture effluents at three different flux velocities (1.5, 3 and 4.5 L h^{-1}) using a 36-respirometer system, each with a 0.5 L capacity. Under inverted photoperiod conditions, free variations in the environmental parameters were allowed to mimic effluent conditions during a pair of 12-h trials. The *FR*s for both species (0.124, 0.328 and 0.402 L h^{-1} for the Cortez oyster; 0.093, 0.189 and 0.345 L h^{-1} for the mud cockle) were relatively low as compared with those reported for similar or related species. The *CR*s were higher for the Cortez oyster (20.04, 52.92 and 64.70 L h^{-1}) than for the mud cockle (10.96, 22.95 and 42.12 L h^{-1}); in both cases, the values were in the range reported previously for the last species. The *AE* for both mollusks (over 92% for the Cortez oyster and over 95% for the mud cockle) was very high and greater than that found by other authors for the same or related species. The three filtration variables were better at higher effluent flux velocities. These preliminary results strongly suggest that both species are good candidates to be considered for bioremediation of aquaculture effluents.

Keywords: filtration variables, *Crassostrea corteziensis*, *Anadara tuberculosa*, biofiltration, bioremediation

Introduction

One of the major challenges of world aquaculture is to produce more in a lower space without an important and/or a progressive impact on the environment, which may affect the quality and diversity of natural ecosystems in one or more of their biotic and abiotic components (Phillips 1998). The main impacts on aquaculture are related to the uncontrolled discharge of organic and inorganic wastes arising from unconsumed supplemental feeds, fertilizers and additives used to increase the natural productivity of the system (Tacon 2002).

Bivalve mollusks are mostly filterfeeders, which means that they have the capacity to remove suspended organic and inorganic solids from the water column and reject them as pseudo faeces after obtaining the nutrients. In ecologically balanced aquaculture farms, trophically lower organisms such as mollusks can feed on waste waters of carnivore or omnivore animals, maintaining an energy cycle inside the farm (Neori 2007; Neori *et al.* 2007). This capacity makes the bivalve mollusks potentially useful as biological filters in the bioremediation of effluents,