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Research Abstract

## Strategy of Bioremediation in Recirculating Aquaculture Systems Using Constructed Microbial Mats

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**Abstract:** Due to strict international standards, every day there is greater interest in developing environmentally sound treatment systems in aquaculture facilities that can remove contaminants from effluent and allows for the reuse of the water. A promising biotechnology is to use microbial mats in recirculating aquaculture systems (RAS). We developed four independent pilot systems (200 L) integrating shrimp culture with microbial mats (two filamentous cyanobacteria, *Lyngbya* sp. and *Anabaena* sp., one diatom *Chaetoceros* sp. and the other of ammonia-oxidizing bacteria and nitrite oxidizing bacterial). The removal percentage of TAN performed by cyanobacteria was about 25%, while *Chaetoceros* sp. removed 43.5 % in the same time, with a removal rate of  $30.22 \pm 10.93$  g TAN d<sup>-1</sup>. The algal species present determine the efficiency of the mat; cyanobacteria are often the colonizing, prevailing and dominant group in abundance and diversity, but not necessarily the most efficient for the required bioremediation. The bacterial mats showed high removal efficiencies for nitrogen 82.15% (TAN) and 70.51% of Nitrogen Inorganic Total (NIT). It was concluded that microbial mats are an effective technical strategy to integrate in RAS systems to farm *Litopenaeus vannamei* due to its metabolic diversity enables the simultaneous absorption, oxidation, and reduction of nutrients.

**Keywords:** Bioremediation, Microbial Mats, Recirculating Aquaculture Systems, Water Quality, Shrimp.

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