

Title: Influence of the presence of tilapias (*Oreochromis niloticus*) on the biofilm of a recirculating water systems in aquaculture

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Abstract:

Recirculating water systems in aquaculture (RAS) are an alternative to the production of aquatic animals. In these systems, the microorganisms present affect and are affected by organisms grown. The aim of this study was to test the influence of production of tilapia (*Oreochromis niloticus*) in biofilm after 60 days of development of the animals. The presence and number of nitrifying bacteria (AOB β -proteobacteria, *Nitrobacter* and *Nitrospira*), potential probiotic (*Bacillus* sp. and *Enterococcus* sp.) and pathogenic for tilapia and humans (*Aeromonas*, *Streptococcus*, *Fusobacterium nucleatum*, *Treponema denticola*, *Campylobacter rectus*, *Prevotella nigrescens*, *Vibrio*, *Pseudomonas fluorescens*) were evaluated. For this, polyethylene nets (~ 60 cm²; pore 1.5 x 1.5 mm) were placed in the bottom of 1,000 L tanks, with and without tilapia in RAS at Fazenda Experimental de Leopoldina / EPAMIG. Tilapia received feed with potential probiotics. Nets were fixed in PFA (final concentration - 2%) after 60 days, sonicated, centrifuged, filtered and submitted to FISH protocol with probes for interesting bacterial groups. The bacterial density was determined using an epifluorescence microscope. Total bacterial density in biofilm was higher in the tanks with tilapia (1.31 ± 0.15 cells $\cdot 10^9 g^{-1}$) than tanks without tilapia (0.83 ± 0.17 cells $\cdot 10^9 g^{-1}$). Nitrifying bacterial groups showed higher densities in tanks with tilapia than tanks without tilapia. Likewise, potentially probiotic bacteria added to the feed and *C. rectus* and *Streptococcus* were also higher in tanks with tilapia. In contrast, *F. nucleatum* densities and *T. denticola* were higher in tanks without tilapia. We conclude that, even in a system of water recirculation, the higher bacterial density in biofilm tanks with fish may be related to the fact that these tanks have a higher amount of nutrients directly deposited via the feed and fish excretion.

Keywords: Biofilm, probiotic, pathogenic, aquaculture

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