

Cage aquaculture, eutrophication and toxins in large freshwater reservoirs in Southeastern Brazil.

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Abstract

Large freshwater reservoirs in Southeastern Brazil host an expanding number of tilapia cage aquaculture farms. This modality have been steadily growing in Brazil in the past fifteen years, raising concerns on environmental impacts. Although most reservoirs in this region have good water quality, eutrophication can result on spoiled production due to accumulation toxins in the fish flesh. This study aimed to study possible relationships of cage aquaculture, eutrophication, and levels of cyanotoxins on water where fish is cultured. Six fish farms in three different river basins in Southeastern Brazil were sampled in dry/rainy season for two years, collecting field data on limnology. Phytoplankton was studied using pigment analysis, morphological and molecular approaches; microcystins RR, YR and LR in the water was quantified by HPLC. No evidence of impacts of aquaculture upon eutrophication was found. Phytoplankton community had an important presence of cyanobacteria, reporting taxons to be able to produce toxins *Cylindrospermopsis raciborskii*, *Microcystis aeruginosa*, *M. panniformis*, *M. protocystis*, *Radiocystis fernandoi* e *Synechocystis aquatilis*. Maximum levels of microcystins were 6,7 $\mu\text{g L}^{-1}$, from eutrophicated river basins, while in most farms studied levels were below 1 $\mu\text{g L}^{-1}$ or undetectable. Preliminary results also evidences that toxin levels during the severe drought of 2014/2015 were higher than in 2015/2016. There was no significant increase of toxins inside the farms, but toxins are present in the most eutrophic sites, and can affect quality of aquaculture products.