BIOFILM COMMUNITY AS A TOOL FOR MONITORING DISSOLVED AQUACULTURE WASTES

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Abstract

The aim of this work was to test biofilm as a tool to detect and quantify fish farm wastes related to OM and metals. Glass slides were deployed along a spatial transect from a fish farm in June and September of 2008 for the same time span (16 days). After the retrieval of the slides element concentrations and stable isotopes concentrations $\delta^{13}C$ and $\delta^{15}N$ were measured. This work demonstrates that fish farm releases important quantities not only of carbon and nutrients but also of Cu and Zn and demonstrates that biofilm can be used as a useful tool to monitor these wastes.

Keywords: Aquaculture, Eutrophication, Organic Matter, Metals

Relatively few studies have examined the effects of fish farm inputs on the pelagic environment [1] and these studies have shown little or no effect of dissolved wastes on most of the studied variables [2]. Even though, the release of dissolved wastes from aquaculture practices is considerable large and maybe, the experimental designs used in the studies to date, have failed to demonstrate aquaculture impact on the water column [3] due to the dilution of the pollutants. Metals are other pollutants derived from aquaculture practices, (e.g. feed and antifouling products), which have being little studied in the benthic system [4], but nothing in the water column. Microbial communities are highly sensitive to changes in water quality and respond rapidly to changing environmental conditions. Analysing shifts in microbial community structure on artificial biofilm surfaces facilitates a direct comparison of communities between sites without confounding environmental and physical variables [5]. Stable isotopes are used to elucidate the source of carbon (C) and nitrogen, but also have helped to investigate the trophic status of the whole community compared to another. The aim of this work was to test biofilm as a tool to detect and quantify fish farm wastes related to OM and metals.

Glass slides were deployed along a spatial transect from a fish farm in June and September of 2008 for the same time span (16 days). After the retrieval of the slides C, N, P, Fe, Mn, Cu, Zn, Cd, Pb, Ni, As, Cr, Tl, Ba, Se, Sn, Sb concentrations were measured. Same, stable isotopes concentrations $\delta^{13}C$ and $\delta^{15}N$ were measured. Results showed that C, nutrients (N, P) as well as Cu and Zn were clearly affected by fish farm activity, showing a marked accumulation compared to reference stations in both seasons. This work demonstrates that fish farm releases important quantities not only of C and nutrient but also of Cu and Zn and demonstrates that biofilm can be used as a useful tool to monitor these wastes.

References

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