



Structure and function of microbial communities in sediments and stream biofilms

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- *Sediment bacteria*

Azorean lakes, Sete-Cidades and Furnas, are in a eutrophic state for decades despite all investments made regarding the reduction of external phosphorus inputs. Phosphorus internal inputs to lakes might be the result of sediment bacterial activity. To test this hypothesis, microbial diversity in lake sediments was assessed using molecular fingerprint methods (e.g. PCR-DGGE) [1]. The relative amounts and activity of specific microbial groups involved in nitrogen (nitrifying, denitrifying and anammox bacteria), phosphorus (polyphosphate-accumulating bacteria) and sulphur (sulphate reducing bacteria) cycles were evaluated by real-time PCR and microcosm experiments, respectively. Electrochemical studies demonstrated that the microbial community in Lake Furnas sediment are electroactive and can an electrode as the sole electron acceptor.

- *Stream biofilms*

Biofilms are major sites of carbon cycling in streams and rivers. Therefore, it is crucial to improve the knowledge about biofilms' structure and microbial composition to understand their contribution in the self-purification of surface water. The contribution of humic substances (HSs) to biofilm structure and microbial diversity was evaluated in a biofilm flowcell under controlled hydrodynamic conditions [2]. The presence of HSs did not significantly enhance biofilm cell density but influenced bacterial diversity in the biofilm assessed by 16S rRNA sequence analyses.

- *Envisaged collaboration with other researchers*

- i) molecular methods to access bacterial activity in sediments
- ii) methods to access mineralisation of hardly biodegradable compounds

[1] Martins G, Henriques I, Ribeiro DC, Correia A, Bodelier PLE, Cruz JV, Brito AG, Nogueira R, "Sediment microbial community in the volcanic lakes of Azores: molecular biology and phylogenetic analysis", submitted to *FEMS Microbial Ecology*.

[2] Rodrigues AL, Brito AG, Janknecht P, Inácio J, Machado AV, and Nogueira R, "Characterization of biofilm formation on a humic material", *J. Ind. Microbiol. Biotech.* (2008) **11**: 1269–1276.