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ABSTRACT BOOK

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Biofilm extracellular enzyme activities in response to temperature: a latitudinal study

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The extracellular enzyme activities released by microbial biofilms are a primary mechanism for organic matter decomposition. Microbial activity is highly responsive to temperature increase, but this response could change depending on the temperature sensitivity of microbial communities adapted to different climates. Global warming predictions suggest an increase of mean air temperatures, expected to be different at each latitude. Our objective was to examine the temperature sensitivity of 6 different enzymes in epilithic biofilms at 5 different sampling sites across a latitudinal gradient (from 69ºN to 6 ºN). From each site, we measured water quality and we characterised epilithic biofilm functional and structured parameters. Additionally, we incubated extracellular enzyme activities at 5 different temperatures ranging from 4ºC to 32ºC.
Our results showed a remarkably higher temperature sensitivity in the Artic region (69ºN) than sampling sites located at lower latitudes, especially showing higher leu-aminopeptidase activity (organic nitrogen compounds degradation) and phosphatase activity (organic phosphorous compounds degradation) at that site, probably indicating limitation of N and P at higher latitudes in contrast to carbon. Complementary, we observed that activity of enzymes related with organic carbon degradation (β-glucosidase and Cellobiohydrolase activity) clearly decreased as latitude increased, indicating a C-limitation at lower latitudes. Our results help to improve the prediction about temperature responses of organic matter degradation to global warming in river systems around the world, showing different responses in nutrient stoichiometry depending on the latitude of the river sampling sites.