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Diversity of microbial communities associated with mercury contamination in the Colombia's Amazon region

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The use of mercury (Hg) in gold mining is a disturbance process that severely affects the ecosystems of the Colombian Amazon. In environments contaminated with Hg, microbial transformations (reduction and methylation) are the main mechanisms of metal speciation. There are few studies that evaluate the composition of microbial communities and their relationship with biotic and abiotic variables in Hg contaminated areas. In this work we have analyzed, through massive sequencing with Illumina Miseq, the structure of bacterial communities in waters, soils and sediments with different degrees of intervention with gold mining, in two locations of the Colombian Amazon Tarapaca-Amazonas (low intervention) and Taraira-Vaupes (high intervention). We found that in both locations the microbial composition is similar, predominating the Phylum Proteobacteria, Acidobacteria, Actinobacteria and Chloroflexi, which includes genera resistant to Hg. The comparison of the diversity indices for the two localities indicates that in Tarapaca the average richness of OTUs was generally higher than in Taraira, although with a high dispersion, attributable to the differences in richness between sample types and sampling sites, samples from aquatic ecosystems have communities with less richness, which increases in sediments and forest soils. Additionally, the interaction between locality and sample type is also evident in the degree of divergence between the regions the soil and sediment samples are more similar between the two locations than the respective water samples. Among the environmental variables that modulate the composition of the community between localities are the textures of the support (sand and clay). And other environmental variables are Na and K that modulate the composition by the type of samples (water versus soil and sediment). Regarding the variables mercury and methyl-mercury (CH3Hg), its effect is not global but site-specific. This could be due to the ability of Hg to be immobilized with other elements and form stable non-bioavailable molecules.

Biography

Gladys Cardona has completed her Master's degree in Biological Science and PhD in Biological Systems. She has experience in microbial ecology in Amazonian ecosystems, especially in forest soils to look for microorganisms that promote growth, bioremediation and restoration.

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