

Eukaryotic picophytoplankton community response to copper enrichment in a metal-perturbed coastal environment

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Abstract

Copper is an essential micronutrient, especially for photosynthetic organisms, but can be toxic at high concentrations. In the past years, coastal waters have been exposed to an increase in copper concentration due to anthropogenic inputs. One well known case is the Chañaral area (Easter South Pacific coast), where a long term coastal copper enrichment event has occurred. That event strongly affected benthic marine diversity, including microbial communities. In this work, microcosm experiments were carried out to address the changes on picophytoplankton community composition of the disturbed area, when challenged to copper additions. Eukaryotic picophytoplankton communities from two areas were analyzed: one in the most copper-perturbed area and another at the north edge of the perturbed area. Flow cytometry data showed that 25 $\mu\text{g L}^{-1}$ of copper addition exerted a positive effect in the growth kinetics on part of the eukaryotic picophytoplankton communities, independently of the site. 16S-plastid terminal restriction fragment length polymorphisms analysis suggested that eukaryotic picophytoplankton display a short and directional response to high copper levels. Members of the Prasinophyceae class, a Coscinodiscophyceae diatom, as well as *Phaeocystis*, respond in a short time to the environmental disturbance, making them excellent candidates for further studies to evaluate phytoplanktonic species as sentinels for copper disturbances in coastal marine ecosystems.