EFFECT OF SALINITY CHANGES ON THE MORPHOLOGY AND THE CELLULAR PROCESSES OF DIATOMS

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The composition of the phytoplankton community and the morphology of the silica frustule of diatoms (i.e., pore diameter and thickness of the silica cell wall) fluctuate depending on environmental conditions. Here we focus on the impact of salinity changes in marine environments (i.e., associated to climate change and/or desalination) on the morphology and cellular processes of diatoms. Our project combines ecological, chemical and molecular expertise to understand the impact of excess evaporation and/or brine discharge on the growth, morphology and silica uptake of diatoms. As part of this project, five diatom species: *Cylindrotheca sp.*, *Entomoneis sp.*, *Skeletonema sp.*, *Striatella sp.* and *Amphora sp.* were isolated from the waters of the Gulf St Vincent (South Australia) and have been established as mono-specific cultures in our laboratory. Salinity trials on the growth indicated a species-specific response to salinity changes. In order to obtain a better understanding of the species-specific adaptation to salinity changes, *Striatella sp.* (which adapt very poorly to salinity change) and *Cylindrotheca sp.* (which grows very well in high salinity) were studied for changes in morphology and biosilicification. ^{29}Si cross polarisation-magic angle spinning (CP-MAS) nuclear magnetic resonance (NMR) analysis showed that the Q_4/Q_3 ratio of the ^{29}Si spectra was higher in *Cylindrotheca sp.* cells grown at 50 psu compared to those grown in 36 psu. This indicated the existence of intracellular pools of silica which were in a more condensed form and potentially helps in diatom adaptation to higher salinity conditions. *Striatella sp.* (which grows poorly at 45 psu) showed reduced silica content compared to when cultured at 36 psu. Results from NMR spectroscopy, scanning electron micrographs and expression of silicon transporter genes, which play important role in biosilicification, will be discussed in relation to the growth of these species in different salinities.