

## Salinity Effects on DMSP Concentrations in *Fragilariopsis cylindrus*

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Sea-ice diatoms encounter extreme salinity gradients during seasonal environmental cycles within their natural habitat. Winter sea-ice brine channel salinities have been measured in excess of 200ppt, while salinities in summer melt ponds drop to 10ppt. Dimethylsulfoniopropionate (DMSP) is a compatible solute produced by certain phytoplankton species that may serve osmoregulatory functions during salinity acclimation. DMSP also plays important roles in climate and biogeochemical cycles and therefore the physio-biological parameters controlling its production are of critical interest. The current experiment investigates intracellular and extracellular DMSP levels in the polar sea-ice diatom *Fragilariopsis cylindrus* in response to shifts in salinity. Log phase cultures initially grown at 35ppt were manipulated over a 24 hour period with media of varying salinities to achieve final salinities of 10ppt, 20ppt, 35ppt, 50ppt, and 70ppt. Cell counts, chlorophyll a (chl *a*), photosynthetic efficiency ( $F_v/F_M$ ), and total and dissolved DMSP were quantified at various time points during the three week experiment. Osmolality, carbonate alkalinity, and pH were also monitored during the course of the experiment. We hypothesize intracellular DMSP will increase in response to increasing external salinities, and decrease in response to decreasing external salinities coinciding with increases in extracellular (dissolved) DMSP. These results will be used to refine conditions for a follow-up proteomics experiment aimed at elucidating proteins associated with salinity stress and DMSP metabolism.

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