

Mycosporine-Like Amino Acids in Antarctic Sea Ice Algae, and Their Response to UVB Radiation

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Mycosporine like amino acids (MAAs) were detected in low concentration in sea ice algae growing in situ at Cape Evans, Antarctica. Four areas of sea ice were covered with plastics of different UV absorption exposing the bottom- ice algal community to a range of UV doses for a period of 15 days. Algae were exposed to visible radiation only; visible + UV radiation; and visible + enhanced UV radiation. MAA content per cell at the start of the experiment was low in snow-covered plots but higher in samples from ice with no snow cover. During the study period, the MAA content per cell reduced in all treatments, but the rate of this decline was less under both ambient UV and visible radiation than under snow covered plots. While low doses of UVB radiation may have stimulated some MAA production (or at least slowed its loss), relatively high doses of UVB radiation resulted in almost complete loss of MAAs from ice algal cells. Despite this reduction in MAA content per cell, the diatoms in all samples grew well, and there was no discernible effect on viability. This suggests that MAAs may play a minor role as photoprotectants in sea ice algae. The unique structure of the bottom ice algal community may provide a self-shading effect such that algal cells closest to the surface of the ice contain more MAAs than those below them and confer a degree of protection on the community as a whole.