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COMPARING THE RESPONSE OF ANTARCTIC, TROPICAL AND TEMPERATE MICROALGAE TO ULTRAVIOLET RADIATION (UVR) STRESS

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As part of our research on stress adaptation of Antarctic microalgae, we compared the response and adaptation of Antarctic, tropical and temperate microalgae to ultraviolet radiation (UVR) stress. Microalgae of similar taxa from the Antarctic (*Chlamydomonas* UMACC 229, *Chlorella* UMACC 237 and *Navicula* UMACC 231), tropical (*Chlamydomonas augustae* UMACC 246, *Chlorella vulgaris* UMACC 001 and *Amphiprora* UMACC 259) and temperate (*Chlamydomonas augustae* UMACC 247, *Chlorella vulgaris* UMACC 248 and *Navicula incerta* UMACC 249) regions were exposed to different UVR conditions. The cultures were exposed to the following conditions: PAR (92 μmol m^{-2} s^{-1}), UVA (854 μW cm^{-2}) + PAR and UVA + UVB (117 μW cm^{-2}) + PAR. The cultures were exposed daily to the UVA and UVB conditions for different duration, ranging from 1.5, 3 to 6 h in the light period (12:12 h light-dark cycle) for 10 days. There was no marked effect of UVA on the growth of all the algae studied. In contrast, growth of the cultures decreased with increasing exposure of UVB. The UVB exposure period causing 50% inhibition (ID50) was determined to assess the sensitivity of the microalgae to UVB. Both the temperate microalgae *Chlamydomonas augustae* UMACC 247 and *Chlorella vulgaris* UMACC 248 were more sensitive to UVB than the Antarctic and tropical strains. In contrast, the tropical diatom *Amphiprora* UMACC 239 was more sensitive than the Antarctic and temperate strains. Lipid content and percentage of polyunsaturated fatty acids (PUFA) of all the microalgae studied decreased with increasing duration of UVB exposure. The decrease in percentage of PUFA due to UVB stress may affect the nutritional quality of the microalgae to organisms at the higher trophic levels. In the summer of 2005, the Antarctic strains were exposed to field conditions at Casey Station, Antarctica. Their growth response and fatty acid profiles were compared with results obtained from the laboratory studies.