



## Ultraviolet radiation negatively affects growth but not food quality of arctic diatoms

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**ABSTRACT:** We studied the short-term effects of ultraviolet radiation (UV radiation, 280-400 nm) on the fatty acid composition and cellular stoichiometry of three dominant arctic diatom species (*Thalassiosira antarctica* var. *borealis*, *Chaetoceros socialis*, *Bacterosira bathyomphala*) in laboratory experiments. Photosynthetic efficiency during UV irradiation was inhibited 90%, which led to a substantial reduction in biomass. In contrast to results of previous studies, the percentage of total polyunsaturated fatty acids (PUFAs) did not decrease during UV exposure. Instead, the two major PUFAs, 16:4(n-1) and 20:5(n-3), of *B. bathyomphala* increased, and the PUFA content of *T. antarctica* and *C. socialis* did not change significantly. However, the monounsaturated fatty acid 16:1(n-7) content in all three species substantially decreased during UV radiation. Since high concentrations of 16:1(n-7) are usually associated with exponential growth under favorable conditions, UV radiation probably did not affect a specific type of fatty acid directly; the fatty acid profile rather reflected a general deterioration in the algal physiological state. The nutritional quality of the fatty acids did not decrease during UV exposure; the C: P and N: P ratios decreased by 50% in all species, whereas the C:N ratios increased slightly in two species. Our results indicate that UV radiation has strong negative effects on photosynthesis and biomass production, but not on food quality with regard to PUFAs and stoichiometry.

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