

THE INFLUENCE OF NUTRIENT LIMITATION ON ANTIOXIDANT ACTIVITY AND UV-SUSCEPTIBILITY OF *PHAEODACTYLUM TRICORNUTUM*

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The influence of nutrient limitation on C:N:P ratios, carotenoid content and lipid formation as well as on overall biomass composition is well-described in literature. On the other hand, much less is known about the influence of medium composition on the antioxidant content of microalgae. In previous research, we found that *Phaeodactylum tricornutum* is a microalgal species with moderate to high antioxidant capacity. However, it was observed that samples from the same species, but from different origin, showed significantly different antioxidant activity. Therefore, in this study, we focussed on the effect of nitrogen or phosphorus limitation on total antioxidant activity, phenolic content as well as carotenoid content. Moreover, the effect of the applied nutrient limitation on the susceptibility of *P.tricornutum* to short-term UV exposure was monitored by measuring the decline in quantum yield as well as its recovery after UV-exposure. In accordance with our previous research, the antioxidant activity was more related to the total phenolic content than to the carotenoid content of the algal biomass. The data further showed that nutrient limitation did not only result in reduced growth and functioning of the photosynthetic apparatus, but also lower levels of phenolics, carotenoids and antioxidant activity were found. Nitrogen limitation was found to have a larger impact than phosphorus limitation. Finally, it was found that the susceptibility of the photosynthetic apparatus towards UV-light exposure was higher under nutrient limited conditions than in nutrient replete conditions. Nitrogen limited cultures were the most UV-sensitive since recovery of the photosynthetic apparatus after UV-exposure was lower than in the other cultures. In conclusion, our results indicate that the physiological changes induced by phosphorus limitation have a different impact on antioxidant response and UV-stress than nitrogen limitation.