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Title: *Photosynthetic characteristics of lichens of genus Umbilicaria from SW Greenland (Nuuk area) in reponse to thallus dehydration*

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Thalli of foliose epilithic lichens *Umbilicaria arctica* and *U.hyperborea* were collected on the rocks at several locations in the neighbourhood of Nuuk, and transported to the Czech Republic where kept in dry state in dark at 5 ^{o}C before experiments. After 48 h rehydration, simultaneous measurements of (1)effective quantum yield ($Yield_{PSII}$) of photosystem II, (2)photochemical reflectance index (PRI), (3)normalized difference vegetation index (NDVI), (4)chlorophyll fluorescence fast kinetics (OJIP) were made in response to gradual thallus dehydration expressed as water potential (WP). Dehydration-response curves of $Yield_{PSII}$ showed S-curve relationship. In both species, the first signs of inhibition of photosynthetic processes appeared at WP of about -10 MPa. Further dehydration led to a decrease in $Yield_{PSII}$ and, finally, full inhibition of PSII photochemical photosynthetic processes. Critical point for PSII processes was found at WP of about -25 MPa, similarly to other epilihic lichens investigated by this method (Bartak et al. 2005). In our study, *U.arctica* showed higher $Yield_{PSII}$ and less sensitivity to dehydration than *U.hyperborea* in the WP range of -5 to -15 MPa. Similarly to previous study (Jupa et al. 2012) done on *U.cylindrica* and *U.decussata* form Svalbard, PRI in *U.arctica* and *U.hyperborea* exhibited curvilinear increase with dehydration. The relation of PRI to WP was, however, species-specific. NDVI, a vigor indicator, decreased with dehydration in both species, however, due to generally black color of *U. hyperborea*, the decrease was much less pronounced in the species. OJIPS recorded in fully hydrated thalli showed typical polyphasic curves with peak chlorophyll fluorescence level "P" found at 150-300 ms followed by a dip "D" typical for trebouxioid lichens (Ilik et al 2006). With more pronounced dehydration, OJIPs exhibited a decrease in chlorophyll fluorescence signal and photosynthetic parameters derived from OJIPS. These changes indicated dehydration-dependent inhibition of photosynthetic processes in both studies species. All the results presented in this study indicated a high degree of tolerance of the two *Umbilicaria* species to partial dehydration stress. However, interspecific differences in photosynthetic parameters were apparent in response to thalli dehydration. ***Acknowledgements***: The authors are grateful to the CzechPolar infrastructure for providing laboratory facilities necessary for the above experiments.

References:

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