UV-radiation effects on photosynthesis and photoprotection in gametophytic and sporophytic stages of the freshwater red alga Kumanoa ambigua (Rhodophyta, Batrachospermales)

Abstract
The aim of this study was to analyze the photosynthetic performance of gametophytic and sporophytic (Chantransia') stages of Kumanoa ambigua in culture under UV radiation. We hypothesized that both life history stages of K. ambigua would exhibit different photosynthetic responses to UVR exposure. Experiments were performed under three conditions: (i) photosynthetically active radiation (PAR) only (400-700nm), P control; (ii) PAR+UVA (320-700nm), PA treatment; and (iii) PAR+UVA+UVB (280-700nm), PAB treatment. The photosynthetic parameters were measured as in vivo chlorophyll a fluorescence. Differences were found between life stages, observing higher values of NPQ and effective quantum yields (F/F-m) under UVA and PAR in gametophytes compared to sporophytes. One type of mycosporine-like amino acid (MAA) was detected in the gametophyte in all treatments, but not in the Chantransia' stage. The increased photosynthetic performance for some parameters and the presence of MAA in gametophyte suggest that it is less sensitive to UV radiation, particularly UVA, in comparison to sporophyte under culture conditions. This approach is relevant for a better understanding of the adaptation and physiological acclimation of freshwater Rhodophyta to varying light climates in terms of global changes. (AU)