

Previous study has shown that *Porphyra* conchocelis is sensitive to high levels of PAR (400–700 nm) as well as ultraviolet radiation (UVR: 280–400 nm), resulting in high inhibition of photosynthesis. However, little is known about whether the inner covering layer of the shell, in which the conchocelis lives, may provide protection against solar UVR. Our study indicates that the covering calcareous matrix is about 0.06 mm thick, transmitting 63, 47, and 28% of PAR, ultraviolet radiation A (UVA: 315–400 nm), and ultraviolet radiation B (UVB: 280–315 nm), respectively. We used a shading layer that simulated the above transmissions, and the effective quantum yield of PSII and photosynthetic carbon fixation in the conchocelis increased to greater extents in the presence of UVA or UVB. Attenuation of UVA by 19% and UVB by 37% due to the shading layer increased the PSII yield by 44%–77% and photosynthetic carbon fixation by about 60%. Our study clearly shows that the photosynthetic machinery of *Porphyra haitanensis* T. J. Chang et B. F. Zheng conchocelis was efficiently protected from harmful UVR by the covering calcareous matrix.