Abstract ASLO 2015 Granada

Elevated CO₂ alleviates high PAR and UV stress in the unicellular Chlorophyte *Dunaliella tertiolecta*

Candela García-Gómez, Francisco J.L Gordillo, Armando Palma, M. Rosario Lorenzo, María Segovia

The effects of increased CO₂ and irradiance on the physiological performance of the chlorophyte Dunaliella tertiolecta were studied at different PAR and UVR (UVA+UVB) irradiances, simulating the solar radiation at different depths, under present (390 ppmv, LC) and predicted CO₂ levels (1000 ppmv, HC). Cell stress after UVR-exposure was mostly attenuated under HC levels, as evidenced by a decrease in reactive oxygen species accumulation. DNA damage showed a 42-fold increase in cyclobutane-pyrimidine dimers formation under the highest irradiance in LC with respect to the lowest irradiance. Photolyase gene expression was upregulated under HC resulting in a drastic decrease in CPDs accumulation to only 25% with respect to LC. However, the expression of genes related to the replacement of photosynthetic apparatus proteins (PsbA and LHCII) were downregulated at HC compared to LC. Proliferating cell nuclear antigen (PCNA) accumulation was always higher in HC and the accumulation pattern indicated its involvement in DNA repair or growth depending on the irradiance doses. Our results suggest that marine unicellular chlorophytes might possibly become more resilient to UVR exposure under future CO₂ regimes.