Title	**Defense Strategies of Algae and Cyanobacteria Against Solar Ultraviolet Radiation**
Author	Ulf Karsten
Journal	Algal Chemical Ecology
Abstract	Ultraviolet radiation (UVR) is a natural fraction of the solar radiation, and therefore has always influenced life in aquatic ecosystems. The development of oxygenic photosynthesis 2.5–2.7 billion years ago (Holland 1984) led to drastic chemical changes in the Earth's oceans and atmosphere. The gradual increase in photosynthetically produced oxygen over millions of years was accompanied by a strong enrichment of it in the atmosphere, which ultimately acted as precursor for the ozone (O3) layer in the stratosphere.
Year	2007
Pages	273- 296
keywords	

Title	**The effects of ultraviolet radiation on photosynthetic performance, growth and sunscreen compounds in aeroterrestrial biofilm algae isolated from building facades**
Author	U. Karsten, S. Lembckeand R. Schumann
Journal	Planta
Abstract	The effects of artificial ultraviolet radiation [UVR; 8 W m−2 ultraviolet-A (UVA), 0.4 W m−2 ultraviolet-B (UVB)] on photosynthetic performance, growth and the capability to synthesise mycosporine-like amino acids (MAAs) was investigated in the aeroterrestrial green algae Stichococcus sp. and Chlorella luteoviridis forming biofilms on building facades, and compared with the responses of two green algae, from soil (Myrmecia incisa) and brackish water (Desmodesmus subspicatus). All species exhibited decreasing quantum efficiency (F v/F m) after 1–3 days exposure to UVR. After 8–12 days treatment, however, all aeroterrestrial isolates exhibited full recovery under UVA and UVA/B. In contrast, D. subspicatus showed only 80% recovery after treatment with UVB. While Stichococcus sp. and C. luteoviridis exhibited a broad tolerance in growth under all radiation conditions tested, M. incisa showed a significant decrease in growth rate after exposure to UVA and UVA/B. Similarly D. subspicatus grew with a reduced rate under UVA, but UVA/B led to full inhibition. Using HPLC, an UV-absorbing MAA (324 nm-MAA) was identified in Stichococcus sp. and C. luteoviridis. While M. incisa contained a specific 322 nm-MAA, D. subspicatus lacked any trace of such compounds. UV-exposure experiments indicated that all MAA-containing species are capable of synthesizing and accumulating these compounds, thus supporting their function as an UV-sunscreen. All data well explain the conspicuous ecological success of aeroterrestrial green algae in biofilms on facades. Biosynthesis and accumulation of MAAs under UVR seem to result in a reduced UV-sensitivity of growth and photosynthesis, which consequently may enhance survival in the environmentally harsh habitat.
Year	2006
Pages	991- 1000
keywords	