



Photochemical and microbial decomposition of dissolved organic matter derived from an emergent macrophyte

A. V. Vähätalo (1,2), R. G. Wetzel (1)

(1) University of North Carolina at Chapel Hill, North Carolina, USA, (2) University of Helsinki, Finland (anssi.vahatalo@helsinki.fi / Phone: +358-9-19157825)

In order to understand the fate of terrestrially derived dissolved organic matter (DOM) in lakes or coastal waters, the decomposition of DOM needs to be assessed in the presence of major decomposing forces (biology and photochemistry) and at the time scales relevant to the hydrological retention times of water. This study assessed the photochemical and microbial decomposition of wetland derived DOM (leachate of *Juncus effusus*-plant) in experiments lasting up to 898 days. At those time scales, microbes decomposed ca. 50 per cent of DOC and chromophoric DOM in darkness. Under exposure to natural solar radiation, photochemical reactions decomposed over 99 per cent of chromophores and fluorophores associated to humic substances, and induced a large (6 per mil) isotopic fractionation of organic carbon. The combination of photochemical and microbial decomposition mineralized 96 per cent of organic carbon. The results of this study show that photochemical and microbial reactions can decompose wetland-derived DOM nearly completely at time scales relevant to residence times of water in many lakes and coastal waters.