



Tracing the production and degradation of autochthonous fractions of dissolved organic matter using fluorescence analysis

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ABSTRACT: We present the results of a mesocosm experiment investigating the production and utilization of autochthonous dissolved organic matter (DOM) by the plankton community under different inorganic nutrient regimes. Fluorescence spectroscopy combined with parallel factor analysis was applied to study the dynamics of autochthonous DOM. Seven independent fluorescent fractions were identified, differing in their spectral characteristics, production rates, and sensitivity to photochemical and microbial degradation processes. Five different humic fractions, a marine protein, and a peptide fluorescence were found. The five humic fractions were produced microbially, with the greatest production occurring under combined Si- and P-limiting conditions. The two proteinaceous fractions were produced during exponential growth of phytoplankton, irrespective of biomass composition. Photodegradation was an important sink for the microbially derived humic material, and the marine protein material was susceptible to both photoand microbial degradation.

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