

INFLUENCE OF ZOOPLANKTON ON THE ACCUMULATION AND BIODEGRADABILITY OF AUTOCHTHONOUS DOC

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The accumulation and fate of dissolved organic carbon (DOC) were followed during an experimental diatom bloom in freshwater mesocosms with and without macrozooplankton. The biodegradability of DOC was assayed in independent degradation experiments with bacteria from the mesocosms. Algal biomass was allowed to accumulate 14 days before macrozooplankton was added to one of the mesocosm (+). Chlorophyll a peaked at 103 and 148 $\mu\text{g chl/l}$ after 17 days in + and - grazing, respectively. The concentration of DOC started to increase after 5 days and when the blooms collapsed after 22 days 235 and 284 μM had accumulated in + and - grazing, respectively. Prior to the peak in algal biomass about 100 μM DOC had accumulated and the degradation experiments showed this DOC to be completely biodegradable. During the decline of the bloom the rate of DOC production increased and the degradability changed. About 25 to 30% of the accumulated DOC was now recalcitrant (RDOC). The degradation experiments also showed the DOC degradation kinetics to differ between + and - zooplankton. The presence of macrozooplankton apparently lowered the initial rate of degradation. However, after 230 days of decomposition all experiments with post bloom water reached the same DOC concentration. Grazing by macrozooplankton did not change the concentration of RDOC. Autochthonous DOC produced during the decline of a diatom bloom apparently included a significant fraction of recalcitrant DOC.