MEDFLUX : BIODEGRADABILITY OF LARGE PARTICLES OF DIFFERENT SINKING VELOCITIES

Goutx M. [1], Moriceau B. [2], Guigue C. [3], Pete R. [3], Lee C. [4], Armstrong R. [4], Wakeham S.G. [5], Peterson M.L. [6]

[1] Laboratoire de Microbiologie Marine, Campus de Luminy, Marseille, France - * goutx@com.univ-mrs.fr
[2] Institut Universitaire Européen de la Mer, Site du Technopole Brest-Iroise, Place Nicolas Copernic, Plouzane, France - Brivaela.Moriceau@univ-brest.fr
[3] Laboratoire de Microbiologie Marine, Campus de Luminy, Marseille, France -guigue@com.univ-mrs.fr, pete@com.univ-mrs.fr
[4] Marine Sciences Research Center, Stony Brook University, Stony Brook, NY, USA -cindylee@notes.cc.sunysb.edu
[5] Skidaway Institute of Oceanography, Savannah, GA, USA - stuart@skio.peachnet.edu
[6] Department of Oceanography, University of Washington, Seattle, WA, USA - mlpmlp@u.washington.edu

Abstract

Particle flux is a major vector for the export of biological production from the euphotic layer to the deep ocean. The mechanisms of transformation of organic carbon during its transfer from the surface to the sediment, are important to determine the role of oceans as source or sink of CO_2, a major goal for oceanographic studies. Of particular interest are those implied in degradation and mineralisation of aggregates in the less known mesopelagic layer of the water column (1). In May 7-14 2003, during a multidisciplinary cruise on board the RV *Seward Johnson* II, in North-Western Mediterranean, the NSF-MedFlux program offered a unique opportunity to collect and work on specific components of the particle flux with the aim to elucidate decomposition process during particle sinking.

Key Words: organic matter degradation, particle flux

In the Central Ligurian sea, at the DYFAMED site, lateral transfers are weak, and surface production is rapidly transported to depth through a heterogeneous particle flux. Indeed, the functioning of ecosystems in the productive layer is driven by size structure predator-prey relationships and produces a large variety of sinking particles (2). Flux composition and resistance to bacterial attack of its various components during sinking are important parameters to identify the critical depths of organic matter mineralization in the water column (3).

In order to characterize the flux, large particles were collected from 200 m depth using a new conical, free-floating NetTrap and sorted by sinking velocity using an elutriator. Particles with four different settling velocities were incubated at *in situ* temperature for several days. Bacterial numbers and degradation of organic carbon, lipids and biogenic silica were followed as a function of time. Fig. 1 shows the change in bacterial biomass in the four fractions over time. The biomass is normalized to the amount of organic carbon initially added. Fig. 2 shows the change in OC/TN in two of these fractions over time. The TN was too low to measure in the other two fractions, but it is clear that the initial C/N was very different in fractions separated by settling velocity. Results give insight into relationships between ecosystem size structure and biogenic matter export process to depth by the particle flux. Lipid, amino acid and carbohydrate data will provide further information on the composition of the material.

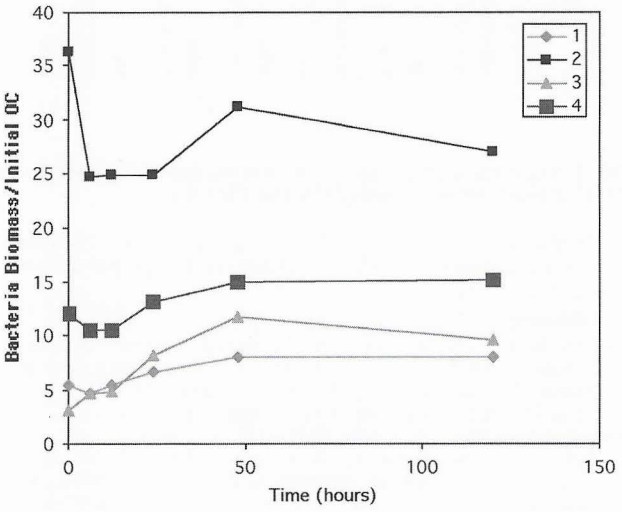

Fig. 1. Change with time in bacterial biomass normalized to initial C (mmol bact C/mol total C) in samples separated by settling velocity.

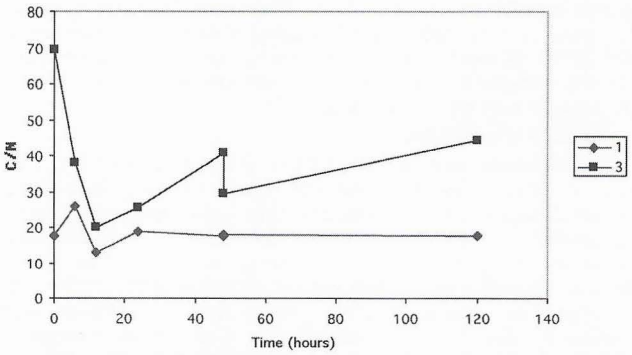

Fig. 2. Change in C/N molar ratio with time in two of the samples separated by settling velocity.

References

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