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Daniele De Corte, Marta M. Varela, Angeles M. Louro, Sarah K. Bercovici, Joaquín Valencia-Vila, **Eva Sintés**, Federico Baltar, Tamara Rodríguez-Ramos, Meinhard Simon, Antonio Bode, Thorsten Dittmar, Jutta Niggemann, 2022.

[**Zooplankton-derived dissolved organic matter composition and its bioavailability to natural prokaryotic communities.**](#)

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Abstract: Zooplankton grazing on phytoplankton promotes the release of particulate and dissolved organic matter (DOM) into the water column and therefore plays a key role in organic matter cycling in aquatic systems. Prokaryotes are the main DOM consumers in the ocean by actively remineralizing and transforming it, contributing to its molecular diversification. To explore the molecular composition of zooplankton-derived DOM and its bioavailability to natural prokaryotic communities, the DOM generated by a mixed zooplankton community in the coastal Atlantic off Spain was used as substrate for a natural prokaryotic community and monitored over a 5-d incubation experiment. The molecular composition of solid-phase extracted DOM was characterized via Fourier-transform ion cyclotron resonance mass spectrometry. After 4 d in the zooplankton-derived DOM amended incubation, the prokaryotic community demonstrated a 17-fold exponential increase in cell number. The prokaryotic growth resulted in a reduction in bulk dissolved organic carbon concentration and the zooplankton-derived DOM was considerably transformed at molecular and bulk elemental levels over the incubation period. The C : N ratio (calculated from the obtained molecular formulae) increased while the functional diversity decreased over the incubation time. In addition, molecular indices pointed to a reduced bioavailability of DOM at the end of the experiment. These findings show that zooplankton excreta are a source of labile organic matter that is quickly metabolized by the prokaryotic community. Therefore, a fraction of carbon is shunted from transfer to secondary consumers similarly to the viral shunt, suggesting that the zooplankton–prokaryotic interactions play an important role in the ocean’s carbon cycle.

Keywords: