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Designation:

Description:

Microbial heterotrophic activity is a major process regulating the flux of dissolved organic matter (DOM) in the ocean. DOM quantity and quality strongly influence its microbial utilization and fate in the ocean. In order to broaden the vertical resolution of leucine-to-carbon conversion factors (CFs), needed for converting substrate incorporation into biomass production by heterotrophic bacteria, nine dilution experiments were performed in the north Atlantic. We found a very consistent depth-stratification in empirical CFs values from epipelagic to bathypelagic waters (3.95 ± 0.05 to 0.90 ± 0.51 kg C mol Leu⁻¹). Our results demonstrated that the customarily used CF of 1.55 kg C mol Leu⁻¹ in oceanic waters leads to an underestimation of prokaryotic heterotrophic production in epi- and mesopelagic waters, while it causes a severe overestimation in bathypelagic waters. Pearson correlations showed that CFs were related not only to hydrographic variables but also to specific phylogenetic groups and DOM quality and quantity indicators. Furthermore, a multiple linear regression model predicting CFs from relatively simple hydrographic and optical spectroscopic measurements is provided. Taken together, our results suggest that differences in CFs throughout the water column might be mostly associated to the quality of DOM affecting the response of particular phylogenetic groups.

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Bacterial community composition and optical signature of DOM shape empirical leucine-to-carbon conversion factors in north-eastern Atlantic waters (0 - 4000 m).

Category

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