Sponges as a source of dissolved inorganic nitrogen: Nitrification mediated by temperate sponges

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Limnol. Oceanogr., 52(3), 2007, 948-958 | DOI: 10.4319/lo.2007.52.3.0948

ABSTRACT: We evaluated rates of carbon and nitrogen ingestion from particulate organic matter and dissolved inorganic nitrogen excretion by six common sponge species from Mediterranean sublittoral rocky bottom habitats. Clearance rates varied from 4 cm^3 dry weight (dry wt)$^{-1}$ min^{-1} to 41 cm^3 dry weight (dry wt)$^{-1}$ min^{-1}, depending on cell type and sponge species. Carbon and nitrogen ingestion rates of picoplankton by the different sponges ranged from 0.17 µg C g dry wt^{-1} min^{-1} to 1.5 µg C g dry wt^{-1} min^{-1} and 2 nmol N g dry wt^{-1} min^{-1} to 13 nmol N g dry wt^{-1} min^{-1}. Although excretion compounds and rates varied between sponge species, most of the species exhibited the ability to excrete significant amounts of nitrate with nitrification rates of 3-13 nmol N g dry wt^{-1} min^{-1}. Only one species (*Dysidea avara*) excreted a significant amount of ammonium. This is the first account of nitrification by temperate sponges. Particulate nitrogen ingestion and dissolved inorganic nitrogen excretion did not balance in most cases, suggesting that Mediterranean sponges may be using alternative sources of organic nitrogen. Sponge activity could have a relevant role in remineralization of organic nitrogen in oligotrophic marine coastal zones.

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