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Microbial food web in coastal waters of Malaysia

Rising atmospheric CO_2 has increased research on the carbon fluxes in oceans because the ocean is an important CO_2 sink. The major flows of carbon in most aquatic systems are primary production and community respiration, especially bacterial respiration. These processes form the main components of the marine microbial food web. Our lab has been investigating the microbial food web in the coastal waters of Malaysia, and this paper summarizes some of the results already published. We have sampled in Port Klang, Port Dickson and Kuantan in areas that represent different trophic conditions. Across the different stations, we found significant coupling between the main phototrophs (phytoplankton) and heterotrophs (bacteria). Net primary productivity (NPP) ranged from 8.5 to 56.0 μg C l^{-1} h^{-1} whereas bacterial production (BP) ranged from 0.2 to 70.7 μg C l^{-1} h^{-1}. The ratio of BP:NPP ranged from 0.4 to 1.4, and suggested that net heterotrophy does occur in the coastal waters of Malaysia. As the transfer of carbon to bacteria is more accurately determined by bacterial carbon demand (BCD), we calculated the BCD using the following equation BCD = BP / BGE where BGE is bacterial growth efficiency that was measured in our lab. BGE ranged from 0.02 to 0.40 and was dependent upon substrate quality as indicated by dissolved organic carbon to nitrogen ratio. In this study, BCD:NPP was above unity at some stations, and showed that net heterotrophy occurred when the concentration of dissolved organic carbon was relatively higher.