Bacterial communities involved in complex organic carbon cycling in a high Arctic fjord: A small beginning towards a larger goal

Warming of Arctic Ocean has large implications for the ecosystem functions and carbon cycling. It has been shown that warming induced increase in primary production, macroalgae biomass, glacier and permafrost melting contributes significant amount of complex particulate and dissolved organic carbon of marine and terrestrial origin to the coastal Arctic ecosystem. Marine heterotrophic bacterial communities hydrolyze these complex organic carbon via secretion of extracellular hydrolytic enzymes to yield sufficiently smaller and simpler substrates (<600 Da) for the bacterial uptake, thus, playing a crucial role in the transfer of complex/refractory carbon to higher trophic level and reducing the carbon export and storage. Moreover, with the continued rise in temperature and concurrent increase in complex organic matter inputs it is anticipated that microbial cycling of complex organic matter will play a decisive role in regulating the carbon export, storage and food web dynamics in the Arctic region. However, despite enormous biogeochemical significance of heterotrophic bacteria not much is known about the bacterial communities involved in complex organic carbon cycling in the high Arctic fjord environment. This presentation will decipher the importance of tiny living creatures (bacteria) under Arctic warming scenario and discuss the results obtained from our field as well as experimental studies conducted in Kongsfjorden. In addition, importance of holistic and collaborative microbiological research program in the Arctic region will be discussed.