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Impact of seasonal changes in nutrient loading on distribution and activity of nitrifiers in a tropical estuary

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Abstract

Estuaries are ecologically important environments, which function as the reception point of nitrogenous inputs of terrestrial and anthropogenic origin. In the present study, we discuss the influence of nutrient characteristics on the distribution and activity of nitrifiers in the water column of Cochin Estuary (CE), a tropical estuary along the southeast Arabian Sea (SEAS). Nitrifying bacteria (i.e. Ammonia- (AOB) and nitrite- (NOB) -oxidizing bacteria), which were enumerated using fluorescent *in situ* hybridization (FISH), showed marked seasonality while maintaining the abundance within an order of 10^7 cells L^{-1}. Denaturing Gradient Gel Electrophoresis (DGGE) analysis of AOB exhibited spatio-temporal adaptability without much variation. Nitrification rate in the CE ranged from 2.25 to 426.17 nmol N L^{-1} h^{-1} and it was 10 to 40 fold higher during the pre-monsoon compared with the monsoon. We attributed this increase to high nutrient availability during pre-monsoon due to low

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