MICROBIAL DIVERSITY AND DISTRIBUTION IN SYNTHETIC AND ORGANIC SUBSTRATES SUNKEN IN DEEP ATLANTIC SOUTH WEST

AMENDOLA, A. M.; PERES, F. V.; PELLIZARI, V. H.

INSTITUTO OCEANOGRÁFICO – UNIVERSIDADE DE SÃO PAULO,(PRAÇA DO OCEANOGRÁFICO, 191. CEP:05508120 SÃO PAULO, SP – BRASIL)

Abstract:

In order to describe the microbial community structure, specially the chemosynthetic community associated to organic islands, such as whale-falls and wood-falls, in oligotrophics deep sea environments in Bacia de Campos (Brazil's southeast coast), two metallic structures (landers) containing three distinct substrates (whale vertebrae, wood logs and synthetic carpets) in triplicates were anchored at the depths of 1500 and 3300 m. After 22 months, the microbial community structure was investigated through rRNA 16S gene sequencing using Illumina Miseq platform, with universal primers (515F-926R) for Archaea and Bacteria domains. The results showed that relative abundance of chemosynthetic groups was higher in organic substrates at the 3300 m depth. The synthetic substrates appear to have the same groups in both depth samples, with a major number of particulate carbon degradation groups. The Adonis statistical analysis showed a significant influence of all substrates in the microbial communities composition, and "substrate" as the most significant parameter, with exception of 3300 m depths, which no significant influence of substrates were observed. The nMDS statistical results and UNIFRAC distance corroborate with the hypothesis that microbial communities are mainly influenced by substrate than by depth. Further, exclusive OTUs observed in synthetic substrates were higher than in organic substrates. This result suggests that microbial communities in organic substrates are probably specialists, whereas those observed in synthetics are probably generalists, using synthetic mainly as a fixation substrate and sinking particles deposited in depth as the carbon source. This study is the first to cover the Archaea domain in these sporadic enrichment events of organic matter in the deep sea of South Atlantic and indicates a strong correlation of microbial communities with degradation processes and chemosynthetic primary production in deep sea organic islands.

Key Words: Chemosynthesis, Whale-falls, Wood-falls, Biofilms, Deep sea

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