



Microbial processes and organic priority substances in marine coastal sediments (Adriatic Sea, Italy)

Annamaria Zoppini (1), Nicoletta Ademollo (1), Stefano Amalfitano (1), Walter Dellisanti (1), Silvia Lungarini (1), Stefano Miserocchi (2), Luisa Patrolecco (1), and Leonardo Langone (2)

(1) IRSA-CNR, Rome, Italy, (zoppini@irsa.cnr.it), (2) ISMAR-CNR, Bologna, Italy

PERSEUS EU FP7 Project aims to identify the interacting patterns of natural and human-derived pressures to assess their impact on marine ecosystems and, using the objectives and principles of the Marine Strategy Framework Directive (MSFD) as a vehicle, to design an effective and innovative research governance framework based on sound scientific knowledge. In the frame of this Project (subtask 1.3.3 ADREX: Adriatic and Ionian Seas Experiment), monitoring surveys were conducted in the Adriatic Sea (Italy) in order to study the variation of structural and functional characteristics of native bacterial communities and the occurrence of selected classes of organic priority substances in sediments. The study area represents a good natural laboratory sensitive to climate variability and human pressure, owing to the semi-enclosed nature of the Adriatic Sea and to the increasing trend of human activities in the coastal regions. During the cruise ADRI-13 (November 2013) and ADRI-14 (October 2014) we sampled several coastal sites from the mouth of the Po River to the Otranto strait. Surface sediments were collected in all areas, while sediment cores were sampled in selected sites. Microbes associated with marine sediments play an important role in the C-flux being responsible for the transformation of organic detritus (autochthonous and allochthonous) into biomass. The sediment bacterial abundance was determined by epifluorescence microscopy and the rate of bacterial carbon production by measuring the ³H-leucine uptake rates. The community respiration rate was estimated by the measurement of the electron transport system (ETS) activity. The sediment contamination level was determined by measuring the concentration of contaminants included in the list of organic priority substances: PAHs, bisphenol A (BPA), alkylphenols (APs). The extraction/clean-up of PAHs, BPA and APs was performed by ultrasonic bath with the appropriate solvents, followed by analytical determination with LC-MS or HPLC UV-fluorescence. The joint analysis of the microbial properties and the concentration of the organic pollutants reflects the impact of anthropic pressure on the selected coastal areas. At the surface layers, the microbial carbon assimilation and mineralization rates were affected by the increasing concentration of pollutants. The highest concentrations of organic pollutants were detected in the deeper sediment layers (20 cm) where a significant reduction of microbial metabolic activities was observed. The results of this study can contribute to acquire information to improve the MSFD and to reach the good environmental status.