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Biomonitoring of Selected Regions of the São Paulo State Seashore Using *Perna perna* Mussels: a Comparison Between the Passive and Active Experiments

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Bivalve mussels such as *Perna perna* have been many times used as biomonitors of water contamination, for many trace elements, due to their filtering capabilities. In the present work, *Perna perna* was used for passive and active biomonitoring experiments, in two regions of the São Paulo state seashore: Caraguatatuba (Cocanha Beach mussel farm), which was the reference region and Santos bay (Ilha das Palmas and Ponta de Itaipu), where contamination from domestic and industrial effluents occur. In the period from the fall of 2005 to the summer of 2006, the *active biomonitoring* experiments were carried out and from the spring of 2008 to the winter of 2009 the *passive biomonitoring* was performed. In the *active biomonitoring* experiments, mussels were transplanted from Cocanha beach to the contaminated sites, in ropes, and left in each site for three months, corresponding to the four seasons of the year. In the case of the *passive biomonitoring*, mussels were collected from the rocks with titanium knives. After the sample treatment, the following trace elements were determined: As, Co, Cr, Fe, Se and Zn by instrumental neutron activation analysis (INAA) and Cd, Hg and Pb by atomic absorption spectroscopy (AAS). It was observed, in the *passive biomonitoring*, that most of the higher values were found in mussels collected in the Cocanha mussel farm. In the *active biomonitoring* with *Perna perna*, in the same areas and seasons of the year a similar situation was observed for Cd (spring), As (spring, summer and winter), Se (summer and winter) and Fe (summer). The high values obtained in the Caraguatatuba region could be related to the fact that the region presents an economy based on services related to tourism, and occupation of illegal housing occurs, including in a permanent protection area. According to reports of the São Paulo environmental agency, Cocanha beach has been impacted over time since its classification ranged from "good" (1999- 2006) to "regular" (2007- 2009). It can be concluded that both experimental approaches of biomonitoring, can yield important results concerning the environmental quality. The active biomonitoring is viable, although more complex from the experimental point of view. Since the *passive biomonitoring* was carried out in a period after the *active biomonitoring* and the values obtained for Cocanha beach were higher for most of the elements, in the first case, these results seem to accompany the worsening of the beach quality.

Keywords: Biomonitoring; *Perna perna*; São Paulo; Active Biomonitoring; Passive Biomonitoring