TITLE: RESPONSE OF MARINE BACTERIAL COMMUNITY TO DIFFERENT SURFACTANTS AND BIOSURFACTANTS USED AS DISPERSANTS IN CRUDE OIL-CONTAMINATED SEAWATER

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The study of strategies to clean-up crude oil-contaminated marine seawater is essential for the maintenance of the marine ecosystem. Chemical dispersants, such as surfactants, have been used to disperse crude oil in contaminated marine environments. However, the use of biosurfactants, which are dispersants naturally produced by microorganisms, appears as a potential alternative to the bioremediation of crude oil-contaminated marine environments. However, little is known about the impact of these molecules on the seawater bacterial communities. Therefore, the aim of this study was to analyze the impact of two different chemical surfactants, Corexit® e Ultrasperse® and of two different biosurfactants, a surfactin and a rhamnolipid (produced by *Bacillus subtilis* and *Pseudomonas aeruginosa*, respectively) on marine bacterial communities and on the bioremediation of crude oil-contaminated seawater. The effect of the surfactants and biosurfactants in marine bacterial community was analyzed using four groups of microcosms containing 20 ml of seawater (collected in Jaconé beach, located in Saquarema-RJ): (1) only water, (2) water contaminated with 1% of crude oil, (3) water added with each surfactant or biosurfactant, and (4) water added with 1% of crude oil and each surfactant or biosurfactant. The microcosms were incubated in the dark at 22ºC with agitation. They were further analyzed after 0, 30 and 60 days of incubation. Culture-independent analyses were performed using direct total DNA extraction followed by PCR-DGGE and sequencing analyses of the 16S rRNA encoding gene (*rrs*). The results showed that each treatment selected a specific bacterial community, as evidenced by DGGE profiles. In addition, the DGGE-based PCA analysis of 30 days-incubated microcosms showed that the control samples (only water) and the samples treated with both biosurfactants and biosurfactants plus oil were separated by Y axis from oil-, both surfactants- and surfactants plus oil-treated samples. After 60 days, the DGGE-based PCA analysis showed the control (only water), oil-, surfactin- and surfactin plus oil-contaminated samples were separated by Y axis from samples treated with rhanmolipid and rhanmolipid plus oil, and by X axis from samples treated with both surfactants and surfactants plus oil. Overall, the bacterial community found in surfactin- and surfactin plus oil-treated microcosms was more similar to that found in uncontaminated water.