THE DEVELOPMENT OF A NEW METHODOLOGY FOR BIODEGRADATION STUDIES IN DEEP WATER ENVIRONMENTS

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The oil production in offshore platforms and the pre-salt reservoirs exploration increased the Brazilian potential to produce oil and also the worries concerning the environmental contamination. Accidents in offshore platforms, such as the Deepwater Horizon oil spill (2010) in the Gulf of Mexico, USA, and the Campos Basin contamination (2011) in Rio de Janeiro, Brazil, are good examples. Bioremediation (processes or strategies used to decontaminate environments making use of microorganisms) has a great relevance in the ecosystem rebalancing. However, little is known about the impact of oil contamination in environments containing high pressure and low temperatures because of the difficulty of simulating these conditions for scientific research. The aims of this study were to (i) develop a methodology to simulate oil contamination in 2000m depth environments (high pressure and low temperatures, which are the conditions found in most Brazilian offshore wells), and (ii) study the impact of pressure, temperature and oil contamination in seawater bacterial communities. To perform this study, seawater samples were collected in Campo do Frade, RJ/Brazil, and the two types of microcosms were set up: microcosms containing 60 ml of seawater and those containing 60 ml of seawater plus 1% of crude oil. Further, the microcosms were divided in different treatments: (i) low temperature and high pressurized microcosms (incubated at 4°C in a hyperbaric chambers reaching pressure of 2000 m depth environments), (ii) unpressurized microcosms incubated at 4°C and (iii) unpressurized microcosms incubated at 22°C. The microbial communities were analyzed before and after 10, 20 and 40 days of microcosms set up. The results showed that high pressurized microcosms remained intact after being removed from the hyperbaric chambers: no leakage or damage was noticed and the methodology used was efficient for simulate the Brazilian offshore environments. Subsequently, the DNA of microbial communities present in each microcosm was obtained. Therefore, this study contributes for the scientific literature as research in the field of low temperature and high-pressurized environments are scarce.

Key words: Bacterial communities, Oil, Hyperbaric Chamber, Pressure, Deep Depths
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