

TITLE: BIOESTIMULATION OF *Pseudomonas aeruginosa* BY MICROCAPSULES OF UREA AND POLY(BUTYLENE SUCCINATE).

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ABSTRACT: The bioestimulation process, one of the possible tools of bioremediation, counts on the participation of different biological agents for the recovery of degraded areas, being a process of low cost, high efficiency and without damages to the environment. Among the biological agents, *Pseudomonas aeruginosa* (Pa) is one of those that presents high efficiency of the degradation of hydrocarbons and their derivatives. The objective of this study is to test the effect of the controlled release of urea on the degradation of glucose by Pa, being a preliminary test to the degradation of hydrocarbons. For this purpose, the strain of *Pseudomonas aeruginosa* ATCC 9027 of INCQS/FIOCRUZ was tested in modified inorganic medium supplemented with glucose as the carbon source. The nitrogen source was available under two conditions: a known concentration of urea predispersed in the modified mineral medium; and another with the urea immobilized in a capsule of poly(butylene succinate) (PBS), in the same concentration of the previous condition and made available gradually. In addition to the characterization of the biopolymer and the capsules formed, periodic urea and glucose doses were performed by commercial kits and protein by the Lowry method over a period of 66 hours. The characterization of microcapsules by SEM and polydispersion revealed spherical shape with a mean diameter of 17  $\mu\text{m}$  and the presence of urea in the interior. The results of the biostimulation assay showed zero concentration of urea in the media containing the capsules throughout the evaluated period and an increase in protein concentration of 3,98  $\mu\text{g/mL}$  to 21,56  $\mu\text{g/mL}$  after 42 hours, corroborating the low consumption of encapsulated urea as soon as it was released gradually. The slow release was proven by comparison with the modified mineral medium, whose available urea was metabolized in the first 18 hours with an increase in protein concentration of 3,24  $\mu\text{g/mL}$  to 455,84  $\mu\text{g/mL}$  after 42 hours. An experiment will be conducted using crude oil as carbon source to evaluate the controlled release system for bioremediation. The encapsulation proved to be efficient and feasible for the next hydrocarbon tests and application in bioremediation.

Keywords: *Pseudomonas aeruginosa*, biopolymer, PBS, bioestimulation, bioremediation.

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