

**TITLE:** BACTERIOSTATIC EFFECT OF BIOSURFACTANT ON BIOFILM FORMED BY *Escherichia coli*

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**ABSTRACT:**

In recent years there has been a significant increase in the production of biosurfactants due to their potential applications in field such as environmental protection, waste oil recovery, health care, food processing industries and especially in the oil industry. However, little is known about the biofilm application of prokaryotic organisms. The objective of this research was to select biosurfactant-producing bacteria and to apply them to a biofilm formed by *Escherichia coli* ATCC 25922. The bacterial strains used for the development of this study were isolated from the São Gonçalo / Cuiabá-MT stream watershed during the November / 2014 to May / 2015. Of the isolated strains, a screening was performed to verify the production of biosurfactant. The confirmation of biosurfactant production was obtained by following the classifications: alpha-hemolysis ( $\alpha$ ) (partial hemolysis), beta-hemolysis ( $\beta$ ) (complete lysis of erythrocytes surrounding the colony, causing a transparent zone around the colony) and gamma haemolysis ( $\gamma$ ) (absence of red cell lysis). The strain that presented the best potential to produce biosurfactant was used in the biofilm removal test. The biosurfactant was applied on the biofilm at concentrations of 0.5, 1.0 and 1.5%. The results demonstrated that of the 237 strains tested, 51.06% presented classification as gamma-hemolytic, 31.22% alpha-hemolysis and 17.72% beta-hemolysis. Randomly 10 beta-hemolytic strains were selected for application in the Plate Spread test, and only the L22C (4.3 cm halo) and L232C (0.97 cm halo) strains showed satisfactory results. *Escherichia coli* was able to produce biofilm on the surface of stainless steel ( $6.80 \log \text{ UFC.cm}^{-2}$ ); however, the biosurfactant produced by the L22C strain had only a bacteriostatic effect on the biofilm, where a reduction capacity of 2.79; 2.86 and 3.58 log cycles at the concentration of 0.5%, 1.0% and 1.5%, respectively. According to the statistical data, there was no significant difference between the concentrations used. In conclusion, only 17.72% of the isolated bacteria were considered to be good biosurfactant producers, with L22C being the one with the best production. In addition, the bacterium L22C is a producer of biosurfactant with great bacteriostatic potential on biofilm formed by *Escherichia coli* ATCC 25922.

**Key words:** Microorganisms; Biological surfactant; Biofilm.