

TITLE: EMULSION INDEXES OF PETRODERIVATIVES BY *PSEUDOMONAS AERUGINOSA* STRAINS

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ABSTRACT:

Pseudomonas aeruginosa is a metabolically versatile Gram-negative rod, able to use oil as sole of carbon and energy. More than 90% of the strains produce pyocyanin, a pigment involved in several mechanisms and possibly including the synthesis of surfactants for assimilating petroleum hydrocarbons during bioremediation of oil-contaminated soil. The aim of this work was to determine and to compare the emulsification indexes (En) of petroderivatives among 5 *P. aeruginosa* pyocyanin-producing strains (PYO+) and 5 pyocyanin non-producing strains (PYO-) isolated from gas station soils. The En was obtained by the emulsifying activity test conducted in tubes filled with equal parts of the aqueous phase, represented by King A broth containing fresh culture, incubated for 72h at 30 °C and 150 rpm, and oily phase, represented by lubricating oil, kerosene and gasoline. After vigorous shaking for 2 minutes, the tubes were kept at room temperature for 72h. The En was determined at 24h intervals, calculated from the measurement of the height emulsion layer, divided by the height of the total volume and multiplied by 100. A solution of 1% SDS was used as a positive control. E_{24-72} decreased following this order: C20-C40 > C11-C14 > C8-C11. All strains emulsified the lubricating oil. En of PYO+ strains were between 50.0-97.8% and of PYO- strains, between 5.0-97.5% (SDS=42.5%). These results may be explained by the site of isolation of the strains being more impacted by lubricant oil. En of kerosene and gasoline were low, probably because they are more volatile compounds which represent more toxicity to the cells. Nevertheless, all the strains emulsified kerosene: En of PYO+ strains between 7.5-15.0%, while PYO- strains between 5.0-22.5% (SDS=10.0%), indicating that once acclimated to the compound, these strains may use kerosene and its derivatives as carbon source. On the other hand, only two strains emulsified gasoline, one PYO+ (En =12.5%) and one PYO- (En =10.0%), (SDS = 37.5%). These results suggest that pyocyanin is presumably related to oil biodegradation by *P. aeruginosa*, however the pigment is not the only species-specific factor involved in this process.

Keywords: bioremediation, hydrocarbonoclastic bacteria, pyocyanin, lubricant oil

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