TITLE: PROSPECTION OF MICRORGANISMS ABLE TO METABOLIZE SULFUROUS POLYCYCLIC AROMATIC COMPOUNDS.

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ABSTRACT:

Biodesulphurization consisted in prospecting microorganisms that developed mechanisms capable of exploring the various metabolic pathways. They are an important strategy for the selective elimination of the sulfur atom from fossil fuels without reducing calorific power as the presence of the sulfur atom in the fossil fuel are commonly associated with recalcitrant molecules. This study aimed to prospect and analyze the metabolic profiles of the bacteria that showed the ability to metabolize polycyclic aromatic sulfur compounds. Soil from landfarm from a refinery was placed in Bioreactor continuously fed with oil for 12 years. 1 mL of suspension was inoculated into minimal medium supplemented with 0.5 mM of DBT (dibenzothiophene) and 0.9 Mm glucose as sole source of sulfur and carbon. They were then incubated at 30 ° C at 150 rpm. This process was repeated with the inoculum to reduce de non-DBT aromatic molecules present in the culture. Serial dilutions at 3, 5, 7, 14 and up to 21 days and plating with the previously described medium were done to isolate microorganisms. The isolated and pure colonies were transferred to plates containing minimal media, supplemented with different organic sulfur compounds (DBT, BT, 4.6DMBT) at concentrations of 0.5 mM and then incubated for a period of up to 21 days to evaluate the ability to grown in others sulfurous polycyclic aromatic compounds. PCR was performed using primers specific for the *dszA*, *dszB* and *dszC* genes. Amplifications were performed for four samples, all for the *dszA* gene (GF1, GF3, GC5, GB1) and none of the other genes. The isolates were submitted to morphological characterization and sequencing. Four strains grown in all sulfurous compounds and amplify for *dszA*, and they are associated with the *Pseudomonas* group with variation of *P. stutzeri* and *P. balearica*. Subsequently, growth kinetics were performed with the selected strains and chromatographic assay. In this assay a significant reduction of DBT in the first hours of the curve up to 72 hours and a production of the 2-hydroxybiphenyl HBP metabolite intermediate of the 4S pathway, even at low concentrations, was detected. The selected isolates have genes involved in biodesulphurization and metabolite compounds intermediate to the desulfurization pathway was detected, showing that these bacteria present a biotechnological potential for applications in the oil industry.

Keywords: 4S pathway, sulfur, Biodesulphurization, Dibenzothiophene, 2- hydroxybipheny

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