FRUCTOSE RICH ALTERNATIVE CARBON SOURCES FOR ENHANCED FOSSIL FUELS BIODESULFURIZATION

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Background: Biodesulfurization allows the removal of recalcitrant sulfur from fossil fuels at mild operating conditions with the aid of microorganisms. However the production of biocatalysts still has elevated costs which hinder its industrial application. So the use of agro-industrial by-products and wastes, as alternative carbon sources could present an opportunity to cheapen the process. In previous works we showed that *Gordonia alkanivorans* strain 1B has the ability to use materials such as recycled paper sludge hydrolysate and carob pulp liquor to grow and desulfurize after some optimization. Since this is a fructophilic bacterium it is important to compare the use of carbon sources progressively richer in fructose.

Objectives: The main objective of this work was to explore and optimize the use of fructose rich alternative carbon sources for biodesulfurization with the strain 1B (e.g. Molasses and Jerusalem artichoke).

Methods: Several syrups and juices were created from the different carbon sources. These were submitted to acidic and enzymatic hydrolysis and water extraction to obtain suitable amounts of fermentable sugars for bacterial growth and treated with $BaCl_2$ to remove sulfate and allow biodesulfurization. The different raw materials were characterized. The cells' physiological state was evaluated through flow cytometry and desulfurization rates were determined through GC analysis of dibenzothiophene consumed and 2-hydroxibyphenyl produced.

Conclusions: Results show that fructose rich carbon sources have great potential and that after some optimization they become better than the commercial sugars.

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