

SELECTION OF YEASTS ABLE TO CONVERT GLYCEROL, XYLOSE AND ARABINOSE INTO BIOFUELS AND CHEMICALS

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Abstract:

The increased demand for energy as well as the environmental concerns about the use of fossil fuels has been encouraging a search for alternative sources of fuels and chemicals. Renewable agro-industrial residues, like xylose and arabinose sugars derived from hemicellulose and crude-glycerol derived from biodiesel production, are important substrates for production of such compounds. In this sense, this work aimed to select yeasts able to convert xylose, arabinose or glycerol in fuels or other chemicals. Wild yeasts were evaluated for their capacity to grow in minimum mineral medium supplemented with xylose (40g/L), arabinose (20g/L) or glycerol (60g/L) as sole carbon source in microtiter plates. Growth was followed and each strain was scored by growth rate and maximum final growth after 72 hours. From that, 45 xylose- 50 glycerol- and 40 arabinose- growing strains were selected. The fermentation capacity of the selected yeasts for each substrate was analyzed in microaerobic conditions. Yeasts were incubated in 1,1 mL in microtiter plates for 48h, afterwards supernatant was collected and the substrate consumption and product formation evaluated. Yeasts selected on glycerol were able to consume up to 80% of the carbon source during 48h of fermentation, while arabinose selected yeasts consumed less than 10% of the carbon source provided. Xylose selected yeasts occupied an intermediary position, consuming approximately 20% of the sugar. The selected yeasts were able to produce high amounts of biomass and other chemicals of interest, such as ethanol and xylitol. Based on these results, 6 candidate yeasts were selected for evaluation of fermentation performance in their respective carbon source of selection during 78 hours. Production yields and fermentation profile will be presented and discussed.

Keywords: Yeast, xylose, glycerol, arabinose, fermentation.

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