FERMENTATION PROCESSES EVALUATION FOR THE PRODUCTION OF ACETIC AND LACTIC ACIDS USING PRETREATED ELEPHANT GRASS LIQUOR

Elisa Bellan Menegussi (PIBIC-CNPq), Sheila Montipó, Roselei Claudete Fontana, Marli Camassola (Orientador(a))

Biorefineries correspond to industrial sectors that employ waste biomass to produce bioproducts such as biofuels, plastics, food and solvents. One strategy for biorefineries is to fully convert the remaining sugars from the pretreated lignocellulosic biomass to generate ethanol. However, during second generation (2G) ethanol fermentation, pentoses in the liquor are not metabolized by most microorganisms. In this study, the detoxified liquor (2.5% *w/*v activated carbon, 50 °C, 200 rpm, 1 h) from pretreated elephant grass (3% *v/*v H_2SO_4, 121 °C, 30 min) was used for the production of acetic acid (AA) and lactic acid (LA) through wild type bacteria *Acetobacter cerevisiae* AV and *Lactobacillus brevis* OR. Different concentrations of nutrients (proteose peptone, yeast extract, dipotassium phosphate and ammonium citrate) were evaluated via Central Compositive Rotational Design (CCRD). Fermentations were carried out with 10% *v/v* inoculum, at 28 °C, 120 rpm, pH 6.0, for 48 h, in 50 mL vials (40 mL reaction volume). When using *A. cerevisiae* AV, there was a production of up to 8.18 g L^{-1} of LA and 6.15 g L^{-1} of AA after 24 h, the initial xylose and glucose concentrations were 7.87 g L^{-1} and 1.29 g L^{-1}, respectively. The CCRD results showed that the supplementation of the medium with higher concentrations of ammonium citrate significantly ($P<0.05$) influenced the production of organic acids. This indicates that lower contents of the other studied nutrients can be used in the current proposal, reducing costs in the industrial production of these chemical inputs. Therefore, promising results can be obtained relating the production of AA and LA in pretreated elephant grass liquor, even employing wild type bacteria. The production of these organic acids in synthetic medium with ammonium citrate, as the only carbon source, will be further evaluated to better understand how this nutrient is metabolized by the studied microorganism.

Palavras-chave: lignocellulosic feedstock, C5-sugars, bioproducts

Apoio: UCS, CNPq