SCREENING OF YEAST STRAINS TOLERANT TO HIGH ALUMINIUM CONCENTRATIONS FOR FIRST GENERATION BIOETHANOL PRODUCTION

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In general, the yeast use sucrose from sugar cane as substrate to produce bioethanol. The main species of yeast used to produce bioethanol is Saccharomyces cerevisiae, being also the yeast species with higher biotechnological application and further explored. Several factors, for example the presence of Al³⁺ in sugar cane juice, reduce the ability of yeast to ferment leading to a lower production of bioethanol. The purpose of this work was to select yeast strains with high aluminum tolerance. First, it was performed an initial screening with 840 yeast strains regard your growth capacity in YPD medium containing aluminium sulfate (Al₂(SO₄)₃,17mmol⁻¹). After this, the fermentations were performed in small scale containing YP (1.0% yeast extract, 2.0% peptone) with 20% of Sucrose and Al₂(SO₄)₃ (5 mM) under agitation (200 rpm) at temperature of 30°C. The bioethanol production rate was evaluated by weight loss, and was made a correlation between the amount of CO₂ released and the amount of produced bioethanol. The yeast strains showed different fermentation profiles. Nine strains displayed a good performance in the preliminary test. When the fermentation was compared with industrial strain (PE-2), the strain Braggeman fresh, showed a higher bioethanol production in presence of aluminum sulfate. These results indicate that the strain (Braggeman fresh) can have differences in some genome regions or genes that favored the fast bioethanol production in medium containing aluminium sulfate. The wild strain LBCM47, isolated from cachaça vats, showed a high fermentation rate in this same condition, indicating that the environment where this yeast was isolated lead to natural selection for stresse conditions. These data showed that further studies, for example QTL (Quantitative Trait Locus) analyze should be conducted, in order to obtain a better understanding of genetic factors that led to Braggeman fresh strain to present higher aluminium tolerance than industrial strain PE-2.