PROTEOMIC ANALYSIS OF SACCHAROMYCES CEREVISIAE STRAINS CAT-1 AND PE-2 FROM BRAZILIAN FUEL ETHANOL INDUSTRY

Santos, R. M.; Eleutherio, E. C. A.; Nogueira, F. C.; De Mesquita, J. F.

Laboratory of Investigation of Stress Factors, UFRJ, Rio de Janeiro, Brasil; Bioinformatics and Computational Biology Group, UNIRIO, Rio de Janeiro, Brasil.

Introduction and objectives Brazilian fermentation process starts with commercial yeasts genetically improved for higher fermentation efficiency. In recent years, wild strains have been widely adopted by the industry. One of the most successful examples are the PE-2 and CAT-1 strains. The goal of this work is to analyze how CAT-1 and PE-2 cultures compete for nutrients in the same environment and compare these strains through quantitative proteomics approach to identify potential characteristics that affected their performance. Materials and methods Competition assay was introduced KanMx4 gene in PE-2 and CAT-1 strains, which confers resistance to geneticin. We mixed the same quantity of CAT-1 and PE-2 cells KanMx4 or PE-2 and CAT-1 KanMx4 in fresh medium and forming colonies monitored throughout the fermentation process. To discriminate between strains, the mixed culture was plated on medium YPD2% supplemented with or without geneticin. The cellular composition, at the beginning and end of a batch fermentation was obtained from the difference between the number of colonies from the plates with and without geneticin (KanMx4 only cells containing the plasmid are able to grow in both media). For proteomics analysis was used to identify isotopic labeling iTRAQ changes on protein expression from the CAT-1 and PE-2. Results We identified the best performance of the CAT-1 strain in competition assay, 1015 expressed proteins were identified in both strains and in both conditions, preliminary results showed that CAT-1 expressed the most protein response to stress, may be a possible feature in their best performance. The PE-2 during a fermentation expressed induce proteins to apoptosis that may compromise its fermentative performance. Conclusions CAT-1 shows a greater robustness to fermentation conditions. Some stress response genes are up-regulated in CAT-1. The levels of proteins involved in apoptosis were reduced in CAT-1. Financial Support: CAPES. Keywords: Alcoholic fermentation, iTRAQ labeling, Saccharomyces cerevisiae.