

TITLE: INDUSTRIAL YEAST STRAINS RESISTANCE TO NATURAL ANTIMICROBIAL COMPOUNDS

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ABSTRACT:

Yeasts have been widely studied and used to produce value-added products by different industrial segments. Among the yeasts, *Saccharomyces cerevisiae* should be highlighted since this yeast have been used for millennia for the production of beer, wine, bread, and also in fuel-ethanol fermentation processes. Thus, a long-term selection and domestication of this yeasts led to the selection of hundreds of strains with desired production traits having significant phenotypic and genetic differences, thereby it is necessary to know the characteristics and behavior of various *S. cerevisiae* strains in different situations. Several strains of this microorganism are extensively used in food and bioethanol industry, in which the use of natural products free of synthetic additives has been a trend. Therefore, the aim of this work was to characterize yeast strains resistance profile in the face of natural bioactives as essential oils (EO). EOs are complex mixtures extracted from plants with high potential to scale down the use of synthetic compounds, which are widely used by several industrial segments to control undesirable contaminants, since they have important antimicrobial and antioxidant properties. In order to determine the resistance profile of different groups of *S. cerevisiae* strains when exposed to EOs and conventional antimicrobial used in bioethanol industry, we evaluated 19 strains, separated in 3 groups (6 Baker's Yeast Strains (BYS); 6 Commercial Yeast Strains (CYS) and 7 Native Yeast Strains (NYS). All strains were distinguished by karyotyping using electrophoretic profile PFGE. The resistance of the strains was established through microdilution test determining Minimal Inhibitory Concentration, using 41 EO, 1 antibiotic used in bioethanol industry and considering two parameters: ability to resist a higher number of different EO and ability to grow in a largest range of concentration using a benchmarking study. EO's evaluated were extracted from plants belonging to Medicinal and Aromatic Plant Collection of CPQBA at UNICAMP. The CYS group as well as NYS presented the best result with more than 65% of resistance. Besides the understanding of the industrial yeasts strains resistance using natural bioactives, our results point out EOs as strong candidates to replace the use of synthetic compounds as antibiotics in industrial processes using yeasts, since many of them have antimicrobial properties but were inert to all yeast strains tested.

Keywords: *Saccharomyces cerevisiae*, yeast, essential oils, bioethanol industry, food industry

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