Genetic Analysis and Phenotypic Variations in a Population of *Saccharomyces cerevisiae* during its Propagation on Molasses

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Stresses are able to induce the appearance of genetic instability in fermentation processes and this decreases growth rates and cell viability. Based on the theory of the genetic renewal, cells from a yeast population are continuously generating diversity, which affects the dominance and permanence of a starter strain in a fermentation process. The aim of present study was to determine phenotypic and genetic variations (random spore analysis) during the inoculum propagation of the strain IQAr/45-1 (*Saccharomyces cerevisiae*) constructed in our laboratory. Growth assays were carried out on plates (YPD, differential medium containing dyes) and in liquid media (molasses and sporulation medium). Random spore analysis was carried out instead of tetrad dissection for determining segregation of phenotypes. Segregates containing a dominant marker (84%) and others showing rough colonies morphology (13%) were observed on YPD medium. The possibility of the appearance of segregants able to flocculate cannot be discarded during long-term fermentations. The predominant phenotype of the segregants colonies grown on YPD medium was indicated by the regular edge and smooth surface (66%). During propagation of the stock culture (34°C) at increasing molasses concentration (sequentially increasing from 3% to 12%, TRS), a decrease in the sporulation capacity from 85% (spores frequency) to 13% was observed, indicating a decrease in the recombinant events that occur during the division cycles. Samples withdrawn during the propagation of the inoculum were plated on eosin and trypan blue medium and the differences in colony colors indicating the generation of variants during the inoculum propagation.

Keywords: inoculum propagation, phenotypic variants, random spore analysis, *Saccharomyces cerevisiae*.

Supported by: BIOEN-FAPESP, CAPES and BNDES.