

TITLE: SCREENING OF NEW *SACCHAROMYCES CEREVISIAE* STRAINS WITH SUPERIOR PERFORMANCE TO BE APPLIED IN RUM PRODUCTION

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ABSTRACT:

Yeasts are the main fermentation actors and directly determine the physicochemical and sensory profile of alcoholic beverages. Despite the intense use of yeast strains in industrial fermentation processes, there is still significant room for improvement in the microbiological sphere of fermentation. The Screening of new yeast strains to be used in industrial processes can be performed using different approaches, allowing more suitable or better performing strains to be carefully selected in order to optimize the production process and obtain differentiated and quality alcoholic beverages. In this study, we aimed to seek for novel *Saccharomyces cerevisiae* candidates isolated from different bioprocesses to be applied in rum production. In this early screening, thirteen previously selected strains (SM-1 to SM-13) with ability to grow in high-gravity (HG) molasses were considered, and then evaluated for relevant technological attributes to the beverage production process: flocculation capacity, foam, and ethanol tolerance. Foam production was determined along fermentation in HG molasses (22°Bx, 30 °C, 37 h) by monitoring foam height (mm). Flocculation was quantitatively estimated by the Helm's test with adaptations. Ethanol sensitivity was evaluated by growth onto YPD plates containing 10%, 12%, 15% and 18% (v/v) of ethanol (30 °C, 7 d). Different flocculation percentages were observed, ranging from 48 to 76%. Most strains had a sedimentation rate between 50-60%, similar to PE-2 control strain. The SM-5, SM-13 and SM-4 strains demonstrated higher sedimentation capacity. Nine strains showed less foam formation, remaining between 5.75-7.75 mm, similar to the control. The other strains had greater foam formation, with SM-2 and SM-7 showing the greatest formation 36.0 mm and 28.5 mm, respectively. All strains showed tolerance to 10% ethanol. Likewise, at the concentration of 12% and 15% ethanol, the strains were also able to grow; some exhibited smaller and slower growth (SM-3, SM-8, SM-9), while the others were more tolerant. At 18% ethanol, only SM-1, SM-12 and SM-13 showed tolerance, as well as the control. Preliminary results suggest that SM-1, SM-12 and SM-13 are the best strains for post trials, given their high tolerance to ethanol, low foaming (6.75-7.25 mm), and flocculation (62.2-75.46%), similar to the control strain (7.25 mm foam formation; 56.36% flocculation). Next steps will be carried out for more accurate assessment for rum production.

Keywords: *Saccharomyces cerevisiae*, high-gravity molasses, stress, rum production.

Development Agency: grant #2020/05927-9, São Paulo Research Foundation (FAPESP).