TITLE: UNRAVELING THE HIDDEN TECHNOLOGICAL POTENTIAL OF NON-CONVENTIONAL YEASTS FOR SPECIALTY BEER BREWING

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ABSTRACT:

Yeasts are the main fermentation actors and directly determine the chemical and flavor profile of alcoholic beverages. Recent researches have demonstrated the hidden opportunity of exploiting the biodiversity of non-conventional yeasts as an innovative source of a number of functional benefits, including flavor enhancement, reducing ethanol and calorie content, etc. The use of non-conventional yeasts primarily relies on the screening of diverse traits and fermentation ability, and is usually employed in co-fermentation with *Saccharomyces cerevisiae*. In this study, we aimed to seek for novel non-*Saccharomyces* candidates isolated from different bioprocesses to be applied in innovative beer production. In this early screening, we considered five species from cachaça and ageing-beer processes: *Dekkera bruxellensis*, *Torulaspora delbrueckii*, *Hanseniaspora guilliermondii*, *H. vineae*, and *Meyerozyma guilliermondii*. Microbial growth was assessed in synthetic YP medium with a sole carbon source (glucose, fructose, sucrose or maltose) in microculture plates. The assays were performed with initial 3×10^6 cell/mL (27ºC), and the growth estimated by absorbance (620 nm) reading (2-h interval, 48 h). Hydrogen sulfide (H_2S) production was estimated by onto BiGGY plate culturing (30ºC, 5 d), and quantified as 0-5 scale, from cream to black-colored colonies. All the strains were able to metabolize those simple sugars, glucose and fructose, but *H. vineae* showed to be non-fructophylic. *D. bruxellensis*, *T. delbrueckii* and *M. guilliermondii* showed good growth performance with sucrose, and only *D. bruxellensis* and *M. guilliermondii* could assimilate maltose in the conditions assayed. *M. guilliermondii, T. delbrueckii,* and *H. vineae* produced a low-moderate H_2S amount in the assays, while *D. bruxellensis* and *H. guilliermondii* showed to be moderate-high producers. Hydrogen sulfide may arise as an off-flavor and mask other beer positive flavors and may be a strain-dependent trait as also influenced by several brewing conditions. Our preliminary results suggest that the yeasts *M. guilliermondii* and *D. bruxellensis* are the best non-conventional yeasts for post trials on the development of specialty beers. *T. delbrueckii* was able to assimilate all sugars except maltose and may fit for low-alcohol beer production. Next steps will be carried out for more accurate assessment for innovative brewing.

Keywords: non-*Saccharomyces*, specialty beer, physiological characterization, bioprospection.

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