Brewer's yeast cell wall adaptation allows its reutilization in brewing, maintaining the yeasts and beer metabolomic profile

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Brewer's yeasts are usually subject to reuse (repitching) in consecutive fermentations, i.e. yeasts are pitched, cropped, and then repitched. Their performance along serial repitching may be affected by several parameters (e.g. osmotic, oxidative, thermal or mechanical stress). Saccharomyces pastorianus displayed no changes regarding its viability (number of cells per mL), as shown in figure. Also, vitality, assessed by flocculation capacity, acidification power, and petite mutation formation, did not show significant variations after 5 consecutive fermentations, much higher than that observed for the inoculum yeast. In fact, yeasts adaption to the fermentation broth to improve the fermentative performance is essential. This adaptation is also noticed in cell wall polysaccharides that confer strength to the cells, namely the glucans, generally described as β1,3-glucans. After the consecutive fermentations, yeasts cell wall polysaccharides are modified by the increase of both α and β1,4-linkages, as observed by the analysis of the Brewers Spent Yeast (BSY), with concomitant decrease of β1,3 ones, conferring resistance to the yeasts. The cell wall modifications may have an essential role for the yeast tolerance during the brewing process, and be repitched several times due to the presence of cellulose-like and glycogen-like polysaccharides. Furthermore, this yeasts' tolerance promotes consistency of the metabolic performance and consequently, a stable beer aroma along the serial repitching operations, as observed by solid-phase microextraction coupled to comprehensive two-dimensional gas chromatography with time-of-flight mass spectrometry (SPME/GC×GC-ToFMS).

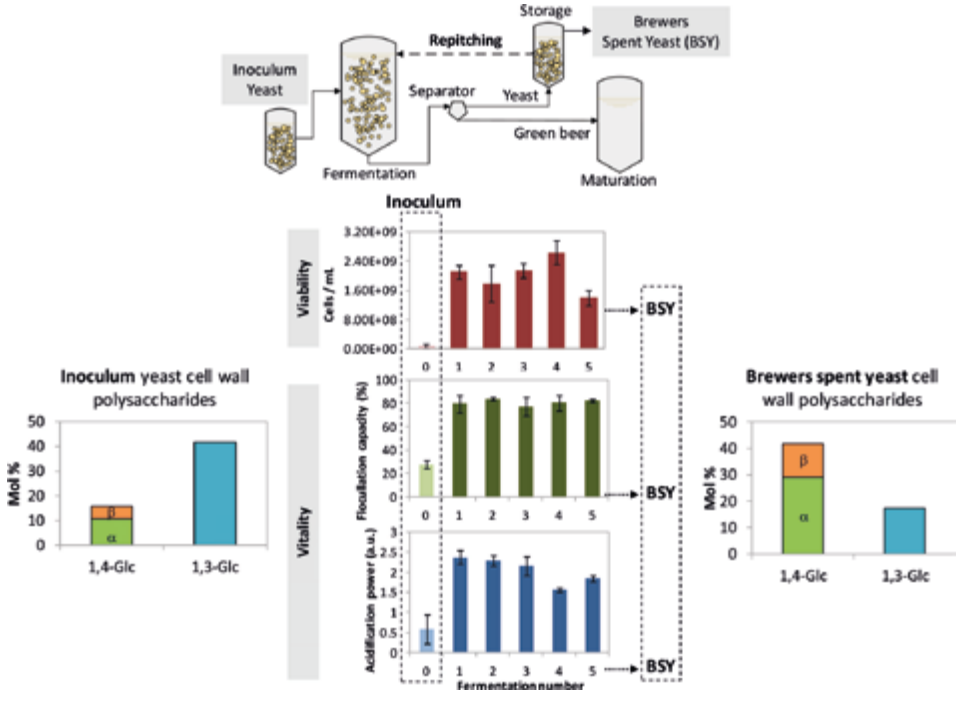

FIGURE 1
Mold cavity containing the SMPU with the embedded FBG and evolution of the Bragg wavelength along with the injection time.