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The kinetics of alcoholic fermentation in model solutions characterised by high sugar concentration: Different behaviour of two yeast strains

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Over the last two decades, the vines in Italy often produce grapes with greater concentrations of phenols and aromatic compounds and greater potential wine quality but even with very high sugar concentrations. As a consequence, the musts obtained are more difficult to process because of the risk of stuck of fermentation, particularly in the warmest region. With the aim of describing the sugars bioconversion during alcoholic fermentation, the time evolution of different initial concentrations of D-glucose and D-fructose, dissolved in a model solution simulating a must (citrate buffer at pH=3.4 inoculated by two yeast strains: *S. cerevisiae* (strain C) and *S. bayanus* (strain B), have been investigated in the presence or not of ethanol. The concentrations of both the substrates and the products of the sugars conversions, as well as the number of viable cells of yeasts, were determined as a function of the alcoholic fermentation time and the related kinetics constants determined. The enzymatic transformation of D-fructose seems to be more sensitive to ethanol accumulation than D-glucose even if there are reliable differences between two strains.

If the reaction medium contained high concentrations of both glucose and fructose (≈300 g/L), the strains showed significant different fermentative ability. Moreover, in these conditions a stuck of fermentation occurred: the remaining sugar was mainly fructose but its concentration changed remarkably with the yeast strain. If the reaction medium contained only glucose as substrate, the strain C seemed more efficient while the kinetics behaviour changed in presence of only fructose.

Biography

Angela Zinnai completed her Ph.D. at the age of 25 years from the Scuola Superiore Sant'Anna, Pisa. She is an associate professor of Food Technology of Pisa University. In 2008, she received a "Special Mention" at "Montana Premium" for Food Science Research (with her colleague Venturi F.). She published more than 80 papers in journals or volumes and serving as a referee for research projects and papers. She was an author in an Original Patent of Pisa University (RM2010A000617) and a scientific responsibles for another (PT2008A000006) that received a "Special mention of the Jury" at 24° SIMEI.

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