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Yeast metabolic engineering or biodiversity: understanding "flavor phenotypes" in traditional fermented beverages.

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Abstract

Development of yeast strains that enhance or increase flavors and sensory complexity of fermented beverages is a challenge. It has been well stated that formation of the most dominant aroma compounds in fermented beverages depend more on yeasts than in the raw material used for fermentation. Application of the same yeast commercial strains in different regions of the world results in uniform products and limits flavor diversity. As sterile conditions are not recommended for the winemaking process, grape and wine microbiology research have contributed substantially to understand how yeast biodiversity could affect the inoculated commercial yeast or how to conduct a spontaneous fermentation. Traditionally, industrial phenotypes searched for in yeast selection are the ability to complete fermentation, higher fermentation rate or the ability to degrade maltose in brewing strains. The "flavor phenotype" is a more complicated concept considering that more than 1300 volatile compounds have been detected in wine.

The principal yeast used in today's food and alcoholic beverage industries for the production of bread, beer, spirits, cider and wine is classified as *Saccharomyces cerevisiae.* However, this model eukaryote represents less than 1 percent of the yeast flora that participates in the grape and wine biotechnology process. Application of non-*Saccharomyces* yeasts and mixed cultures with *Saccharomyces* to increase flavor complexity in fermented beverages will offer ground-breaking opportunities to the food industry. Microbial biodiversity and metabolic engineering strategies are compared as tools to achieve direct impact on the consumer sensory expectations..

Biography

Francisco Carrau is Professor Head of the Enology Section of the Food Science Department of University of the Republic and Head Winemaker of his family owned Winery in Uruguay. He was graduated in Biological Sciences at the University of the Republic Uruguay, Faculty of Sciences, in 1987. In 2003 he obtained his PhD in Chemistry in the same University at the School of Chemistry and at the Australian Wine Research Institute (Dr. Paul A. Henschke). Since April 2011 is leading the Enology and Fermentation Biotechnology Group of the CSIC I+D programme of University of the Republic, UdelaR, Uruguay (2011-2014).