

Research Directions

Office of Research Services

The Science of Better Beer

Dr Vincent Higgins from the School of Biomedical and Health Sciences, Professor Ian Dawes from the University of NSW, and partner investigator Professor Peter Rogers from brewing company Fosters Australia Ltd are exploring the science of yeast fermentation to improve beer stability through an Australian Research Council (ARC) Linkage Project.



'Brewers' yeast, like all other organisms, needs a fairly precise and balanced chemical environment within its single cell in order to function,' says Dr Higgins. 'In the face of stressful conditions like changes in the amount of free oxygen and nutrient availability, the yeast organisms will attempt to control the cell environment or adapt to changing conditions. In the yeast used for beer-making, these adaptations can affect fermentation (the process of converting sugars into alcohol), resulting in slower fermentation and changes in the stability and taste of the beer. Using new techniques to measure the changes in cells at the genetic level, and combining this with a study of how the yeast deals with different environmental conditions and the availability of nutrients, this project will analyse successful yeast management processes that are regularly in use in beer-making to understand how beer stability and quality can be managed effectively.'

Working closely with key scientific and technical staff from Fosters Australia Ltd, the research team will use sophisticated biochemical and genetic assay techniques to identify genes that are used by the yeast to make different cell components, depending on the challenges and changes in the cells environment. The investigators will also look at the mix of nutrients such as fats, carbohydrates, vitamins, minerals and proteins in the yeast cell, and the mix of chemical by-products produced from these nutrients under different environmental conditions both within the cell and outside it. The resulting beer produced under these different conditions will be analysed to assess changes in quality and stability.

This research will provide a clearer understanding of the physiological responses of yeast cells to differing oxygen radical levels. In so doing, the results will not only improve the competitiveness of the Australian beer and wine industry but will have broader applications to areas of human health such as heart disease, arthritis and ageing, in which oxygen radicals have been implicated.

Project Title: The role of redox balance and reactive oxygen species in beer stability using an integrated transcriptomic and metabolomic analysis

Funding has been set at: \$315,000 from ARC and \$434,500 from Fosters Australia Ltd

October 2007

Contact Details:

v.higgins@uws.edu.au

<http://www.uws.edu.au/school/biomedhealth>