Surviving the heat for a good beer

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Researchers at the Institute of Biological, Environmental and Rural Sciences at Aberystwyth University have collaborated with scientists from Dijon, France to try to solve the problem of bad tasting beer.

Beer brewers face a tricky problem. The high level of activity in the yeast used to produce beer generates a lot of heat during the brewing process raising the temperature at the bottom of brewing vats.

Unfortunately yeast often suffers damage to their structure at these high temperatures, and this damage gives the beer a bad taste.

Understanding why some yeast cells survive high temperatures when others perish is key to improving processes such as brewing and with over 20 million pints of beer consumed every day in the UK, this is an issue close to the nation's heart.

The research shows that how much food is provided to the yeast during exposure to hot temperatures is the key to keeping the yeast healthy.

Employing a new approach to this problem - flow cytometry - which uses laser technology to automatically measure cells in a liquid, Dr. Hazel Davey from IBERS, said: "This technique enabled us to study hundreds of thousands of cells in a few seconds, allowing us to identify damaged yeast cells and work out which conditions improved their survival.

We showed that damage can sometimes be reversed in the right

conditions. Our lab strain of yeast recovers well if provided with nutrients during the hot conditions, whereas the brewers' yeast shows better recovery in the absence of nutrients."

Researchers typically use well-adapted lab strains of yeast and provide them with everything they need for growth but in the brewery strains are selected for flavour and efficiency.

This research highlights the different response in lab and industrial strains of yeast to heat stress and the need to study both. A PhD student will continue this research from September this year.

More information: "Surviving the heat: Heterogeneity of response in Saccharomyces cerevisiae provides insight into thermal damage to the membrane." DOI: 10.1111/1462-2920.12866/abstract

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