

Crowd sourcing yeast and rising above the pandemic: the SuperYeast project survival tale

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Our ongoing MeMBrane (Membrane Modulation for Bioprocess Enhancement) project, led by Dr Alan Goddard and funded by BBSRC and the EU via the ERA CoBioTech scheme, aims to produce yeast that are more ethanol tolerant for industrial applications. Whilst we have a library of >6,000 strains, we also wanted to see what the public could provide. As part of MeMBrane, we conducted a pilot study at York Beer Festival in 2019 that proved promising: a warm, inviting, and intrigued reception from brewers, a successful sampling collection method and a working ethanol tolerance assay protocol. During 2019, we also successfully applied to UKRI to expand the project into SuperYeast which was funded in late 2019 for a start in March 2020. On 12 March 2020, the SuperYeast team had finally received ethical approval to start the project. Saturated with excitement, the SuperYeast team disseminated the public call for yeast strains, however, I think we all know what happened next... A week later the prime minister of the UK disseminated the call for the public to stay at home, protect our NHS and save lives. With our researchers bound to their homes, the project halted. Here, I will report the drive behind the project, the implications of COVID-19 and how I diverted from the laboratory bench side to writing in the outdoors.

Finding a 'Super' Yeast

Amid a climate crisis with rising sea levels, resource wars and disrupted food security, it is clear that anthropogenic carbon contribution must become net zero. An example of how to achieve a greener lifestyle is through the use of biofuels – in particular, alcohol made by yeast as opposed to fossil fuels. Researchers at Aston University were searching for a yeast strain capable of withstanding higher levels of alcohol meaning an increased yield of biofuel produced. Additionally, climate change results in grapes containing significantly higher sugar concentrations, meaning that yeast can enter osmotic shock when initially introduced in wine fermentations. The yeast dies before the sugar is used up, thus the

wine produced is sweeter and less well flavoured. If the fermentations get 'stuck', this increases the time, energy and waste involved in wine production. Wineries can add ethanol-tolerant yeast strains to generate more aromatics, however, very few yeast strains can withstand high ethanol concentrations. To sustain the future of wine production, the characterization of yeast strains that can survive in toxic, stressful conditions is also critical.

Adversity faced from COVID-19

The busy rumble of beer festivals, the smell of freshly made goods from bakeries – networking within these areas as portals to collect vast amounts of yeast samples faded into a distant memory. Without access to the laboratory and an unpredictable amount of time in lockdown, there was little use in networking online to secure yeast strains...

Switching pipettes for pens

As the active researcher for SuperYeast, I had to think on my feet to keep the project alive. When a situation arises that you did not predict to be in, instead of pitifully thinking 'why?', I believe it is best to think 'what can I make of this situation?'. Like many real-world application research studies, I could see that the jargon-infiltrated work should be understood by everyone, especially our future generations. This is where the power of science communications is harvested: by creating a channel between scientists and the public we have the ability to spark conversation, question our behaviours and increase fascination. So, I set to work crafting the research project conducted at Aston University into a children's storybook – *Mr. Climate Change and the Beastly Yeast* (read online for free here: <https://www.membrane.org.uk/news-and-events/>). Educating the early years sector is important to help pave the way for a greener future. To make the book more accessible to children, Dr Sarah Routledge in Alan's lab provided some excellent illustrations.

The here and now

In between lockdowns, researcher Lewis Yandle strategically conducted ethanol and osmotolerance assays on yeast strains collected, with our furthest samples transported from Australia! In a shrinking world, we ensured our opportunities in the midst of a pandemic did not shrink alongside it.

For more information on the SuperYeast project, including the SuperYeast Leaderboard, visit www.membrane.org.uk/superyeast/. For information about MeMBrane please contact Dr Alan Goddard ([a.goddard@aston.ac.uk](mailto:goddard@aston.ac.uk)). ■

