

Wilmar BioEthanol – Where has my yeast gone?



Late last year the distillery at Sarina, Central Queensland started to experience an unusual problem. The normally reliable propagation process began to fail at the first step.

Ethanol is produced from the fermentation of sugars in molasses in a batch process lasting 4 to 5 days. At the end of each cycle the yeast is exhausted and another batch of yeast is required. The propagation process generates the quantities of yeast required by starting with a flask of yeast suspension and growing them in a series of larger and larger vessels. The first vessel is PT10 and this is where the problem was noticed.

A team was formed with Brooke Dallow as the team leader; assisting Brooke were Chantal Barnes and Mel McGinley.

Figure 1: The PT10 Team



L to R: Mel McGinley, Chantal Barnes and Brooke Dallow

The teams' first step was to gather information about recent propagations, including those that worked as well as those that failed. The team also investigated the method of failure, trying to understand if all the propagations fail in the same way.

The information gathered was unexpected, all propagations that failed appeared to have the same cause, the yeast were apparently healthy but there just weren't enough of them in the medium.

The team brainstormed possible causes that could result in the yeast remaining healthy but not growing. The team then prioritised the possible causes they thought most likely and attempted to replicate the actual results without any success. One of the most frustrating trials was to take the "failed" propagation mediums and return it to the lab to see if it would grow over time, which it did!

The equipment used for propagation consists of a series of sealed containers in an area that is not under constant observation. Early one morning, one of the operators stumbled upon an unusual occurrence when he noticed a light frothing around the exhaust port of PT10. The team followed-up on this occurrence by re-investigating the possible causes to see if any of them could support the observation.

One possible cause identified was the compressed air that was used to stir the solution might be strong enough to blow the yeast out of solution. This could explain what was observed but it did not explain why some of the propagations failed and not all of them.

The first step was to run an experiment on the next propagation cycle and capture any material that frothed over and compare it to the substrate. The result, the frothed over material had a very high cell count and an almost zero cell count in the substrate.

The final question was why did some propagation batches froth over and not others. One possible cause identified was when the batch was prepared a small amount of defoaming oil was added to the mix to stop it foaming, were all operators adding the same quantity of defoaming oil? Upon investigation the amount of defoaming oil added did vary slightly as the job instructions were open to interpretation.

The final solution was to modify the job instructions to reduce the compressed air flow to

maintain mixing and to clarify the quantity of defoaming oil to add to the propagation batch.

This was a great result by the team. They showed that through persistence you will eventually obtain success to all problems. It certainly highlights the power of having a standard job instruction and sticking to it!

For further information please contact:



Bill Hopton

Managing Navigator

Phone: 0418 663 563

Head Office: +61 2 4226 6184

Website: www.ctpm.org.au