Promoter swap of targeted yeast strain & its change in Flocculation level

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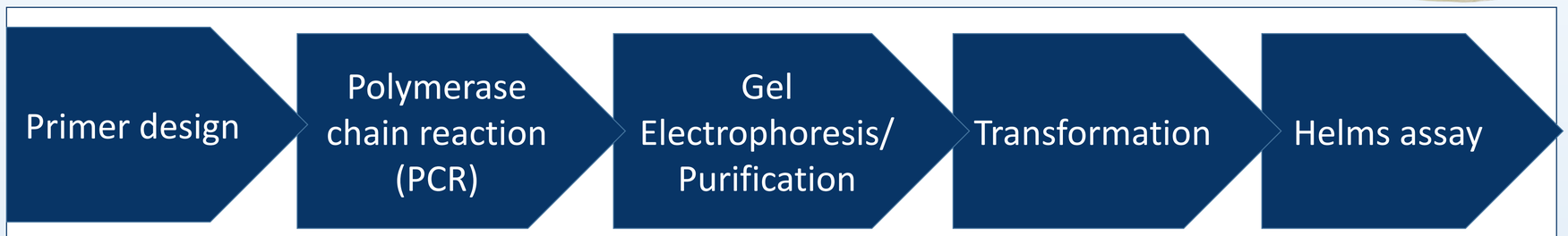
Introduction

- ★ Beers with high flocculant strains can produce a brighter beer with less suspended yeast, which makes filtration easier.
- ★ The yeast in beer goes through a process called flocculation
- ★ Flocculation is when yeast cells clump together (flocs) and become visible.
- ★ Yeast contains a family of several genes called FLO genes.
- ★ Flocculation of yeast is strain-dependent
- ★ It's defined by which FLO genes are functioning and working in each strain because each FLO gene contributes to a different factor.
- ★ FLO11 is involved in flocculation, cell-cell adhesion, filamentous growth & other features.
- ★ Overexpression of the FLO11 gene is know to increase these phenotypes.
- ★ The goal was to swap out the FLO11 promoter with GAL1
- ★ A promoter swap would result in overexpression (more of the gene produced, leading to believe there would be higher flocculation levels).
- ★ Being able to manipulate the strains of yeast for beer would be a game changer for beer lovers everywhere.

Research Topic

- ★ The goal in this study was to <u>increase the flocculation level</u>.
- ★ It was believed that through a promoter swap of the yeast strain WLP570 in the FLO11, flocculation would increase.
- ★ The control was unaltered WLP570, WLP008, WLP004, and WLP002 white lab yeast strains.

Methods



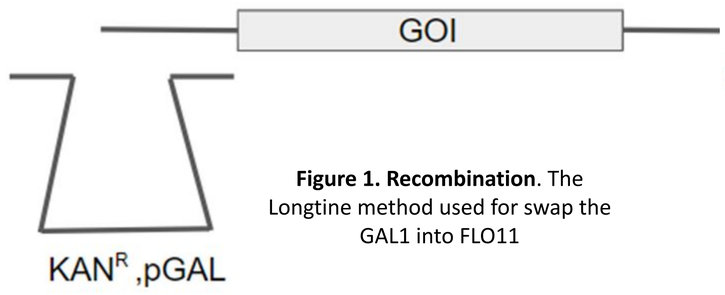


Figure 1. Recombination. The Longtine method used for swap the GAL1 into FLO11

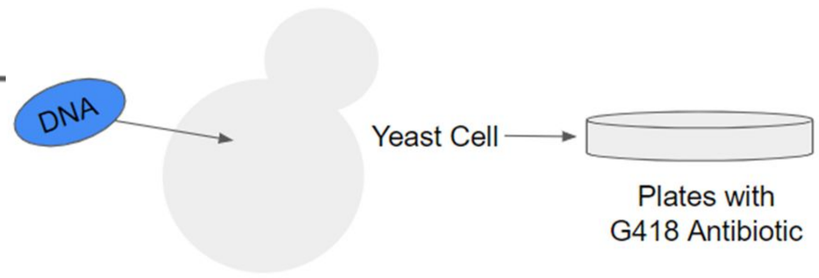


Figure 2. Transformation of Yeast Cells. DNA was mixed into the yeast cells and swabbed onto plates with G418 antibiotic.

Results

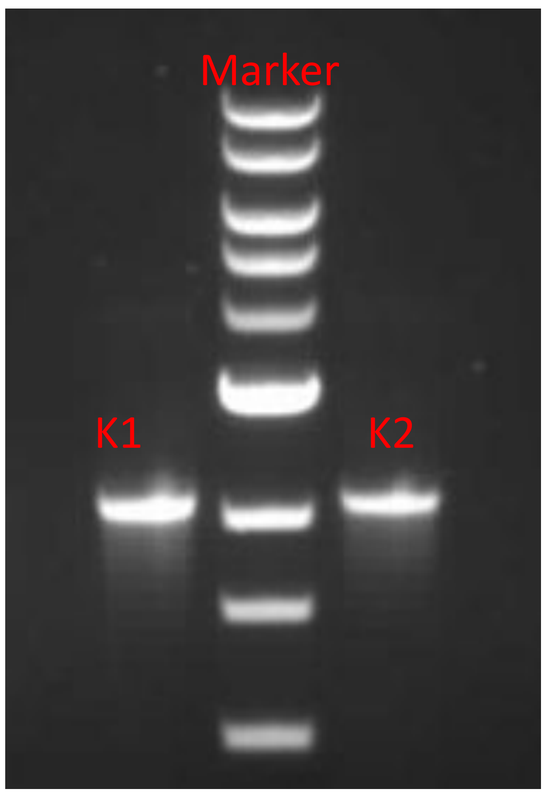


Figure 3. Agarose gel after gel electrophoresis. K1 & K2 both represent a promoter swap.

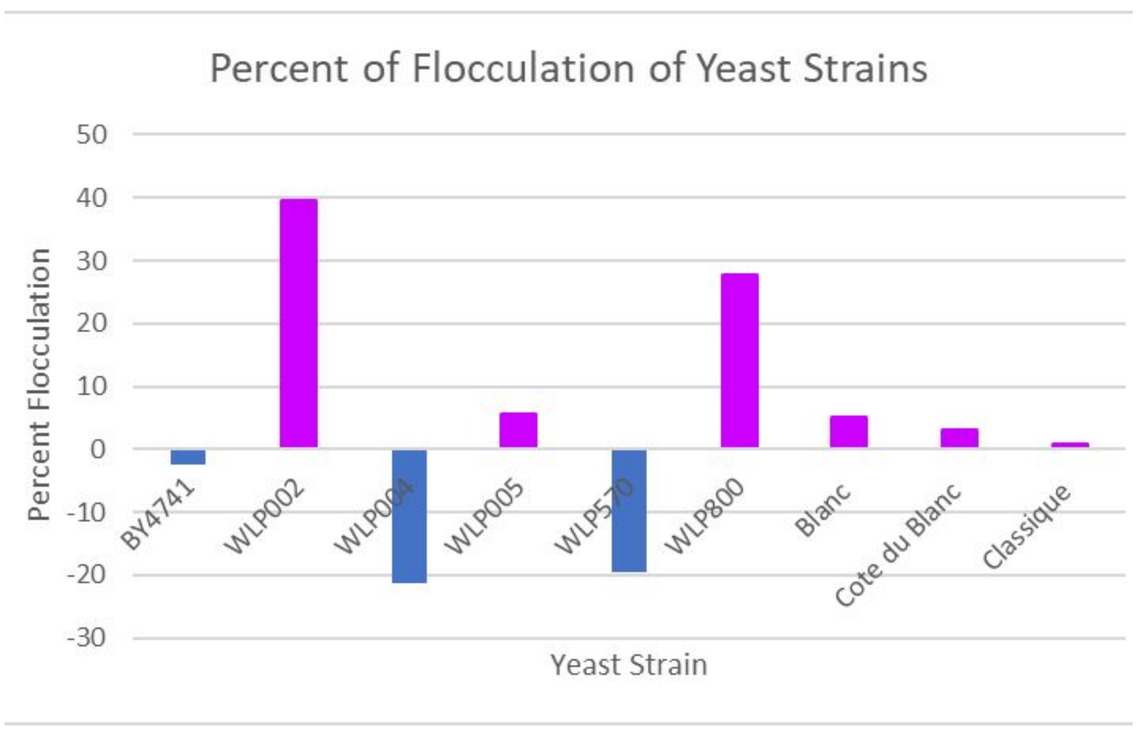


Figure 4 Percent Flocculation. This graph shows the yeast strains percent flocculation after the Helm's assay

Conclusions and Future Directions

- ★ PCR was successful, as seen from gel electrophoresis. The DNA samples were around 2 kilobase pairs. This shows that there was a new DNA fragment generated.
- ★ The transformation was done to transform the PCR samples into yeast cells to select for integration.
- ★ By the end of transformation, there should have been colony formation in the petri dishes.
- ★ Due to the unsuccess, the transformation was completed twice. The first trial's heat bath was 40 minutes at 42OC and it was believed that this amount of time killed of the DNA so, for the second trial the heath bath time was reduced to 20 minutes
- ★ However, he second trial was still unsuccessful.
- ★ The flocculation capacity of wine strains were determined because upon their expected levels of flocculation.
- ★

References & Acknowledgements

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★ Thank you Dr. Beach for you assistance through this experiment.

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