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How Different Solutions of Sucrose Affect Wine and Beer Yeast

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Abstract

In this experiment, we hypothesized that the live cell count for the yeast strains, beer yeast and wine yeast, would increase based on the concentration of the sucrose the yeast strains were mixed with. We were proven incorrect based on the cell count at the end of the three weeks, in which we observed how the yeast did in all ten solutions. We chose this topic because we felt that it was unique, and useful information for people that did not know how sucrose affects specific yeast strains and could use the info gathered for future studies.

Introduction

Yeast is used to be a catalyst for fermentation in products such as beer, wine, and bread. According to Postigo, V., García, M., Cabellos, J. M., & Arroyo, T. (2021), stated in the scholarly journal, *Wine Saccharomyces Yeasts for Beer Fermentation,* the craft beer industry has increased during recent years in Europe, with a growing consumer interest in new beer styles and new flavours.

Knowing this, we wanted to test different types of yeast in different percentages of sucrose, to see which solution increases the growing rate of yeast cells the best. Therefore leading to the question we wanted to answer, how is the growth of different strains of brewery yeast affected when put into different concentrations of sucrose?

Methods

Materials & Location

For this experiment, we kept the solutions, 0%, 10%, 20%, 30%, and 40% Sucrose, mixed with the beer and wine yeast in ten test tubes, and used twelve pipettes to transfer the solutions to ten different test tubes and mix with methylene blue. We then used six hemocytometers to count the live cells under two microscopes.

Procedure

In the beginning of our experiment, we set up ten test tubes with 10 mL of the different yeast solutions in each. We then used a different pipette for each solution, and made a one to ten dilution with methylane blue, and counted the initial live yeast cells for our wine and beer yeast using six homocytometers in total. We continued to count the live cells from each of the sucrose concentrations once each week, using the same dilution, for a total of three weeks altogether.

Figure 2. This picture is showing some of the many materials we used during the time of our experiment.

Graph of Wine Yeast Live Cell Count

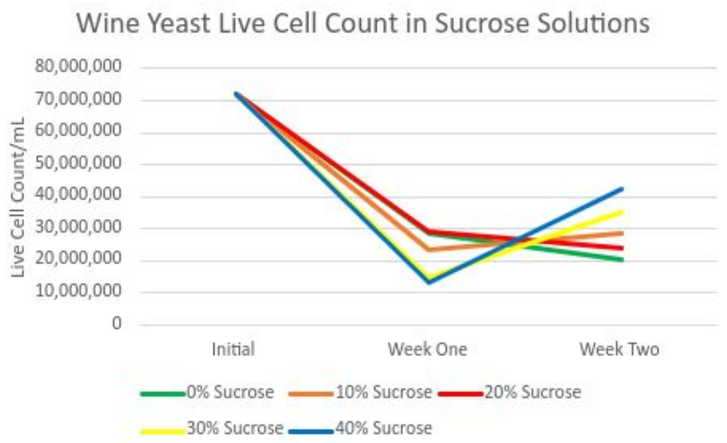

Figure 1. This graph shows the wine yeasts live cell count in the different percentages of sucrose concentration, in the time span of three weeks.

Graph of Beer Yeast Live Cell Count

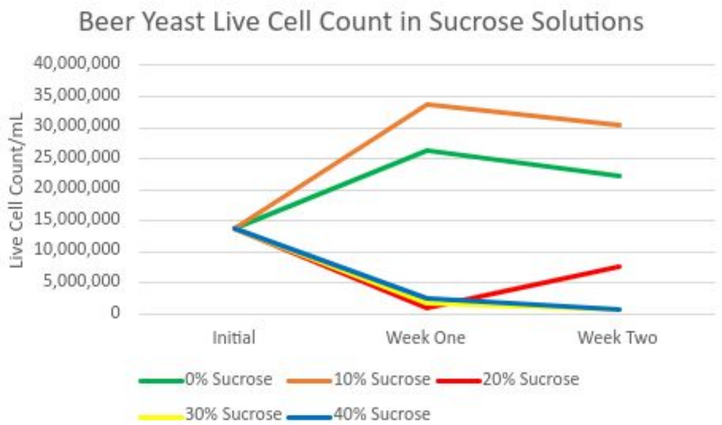

Figure 3. This graph is showing how the beer yeasts live cell count was affected by the different concentrations of sucrose in the time span of three weeks.

Discussion (cl)

Our results showed that our hypothesis was far from the truth, which surprised us. The 40% sucrose had the lowest live cell count at different time periods. However, for the wine yeast, it climbed back up until it had the highest cell count, whereas the beer yeast had the opposite happen, and the 40% and 30 % sucrose ended up having the lowest cell count.

These results showed that beer yeast most definitely had a preference for 0% and 10% sucrose, while wine yeast had a less obvious preference. Understanding the differences between the two could be useful to brewers, and according to Bellon, J. R., Schmid, F., Capone, D. L., Dunn, B. L., & Chambers, P. J. (2013) the screening of newly generated hybrids from a cross between a S. cerevisiae wine yeast and S. mikatae (closely-related but ecologically distant members of the Saccharomyces sensu stricto clade), has identified progeny with robust fermentation properties and winemaking potential. This explains why brewing is becoming more and more popular. Stated by Ishchuk, O. P., Zeljko, T. V., Schifferdecker, A. J., Sofia Mebrahtu Wisén, Hagström, Å.,K., Rozpędowska, E., . . . Jure Piškur †. (2016), the wine and beer yeast Dekkera bruxellensis thrives in environments that are harsh and limiting, especially in concentrations with low oxygen and high ethanol. Environment is something that hadn't been taken into account during this project.

One of the mistakes we made during this project was not using the correct dilution the first time we counted the cells. We had used a 1 to 5 dilution, and found that a 1 to 10 dilution was perfect for counting, which we recommend starting with, and diluting further if need be.

Acknowledgements

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