

# Optimal Temperatures for Cell Proliferation

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## Background

Our study is to consider the impact of temperature on *Saccharomyces cerevisiae* (*S. cerevisiae*) yeast cell life proliferation. We used the temperatures of: 20 C, 30 C, and 40 C., and took the Optical Density 600 (OD600) and cell count every two hours. For a similar study, it was found that the highest growth rate occurs at 35 degrees C (Merritt, 1966). It was expected that our 30 C yeast strain would have the highest rate of growth, while 20 C and 40 C would allow us to understand the magnitude of that growth.

## Objectives

The objective is to determine the impact of different temperature environments on yeast cell growth and viability.

## References

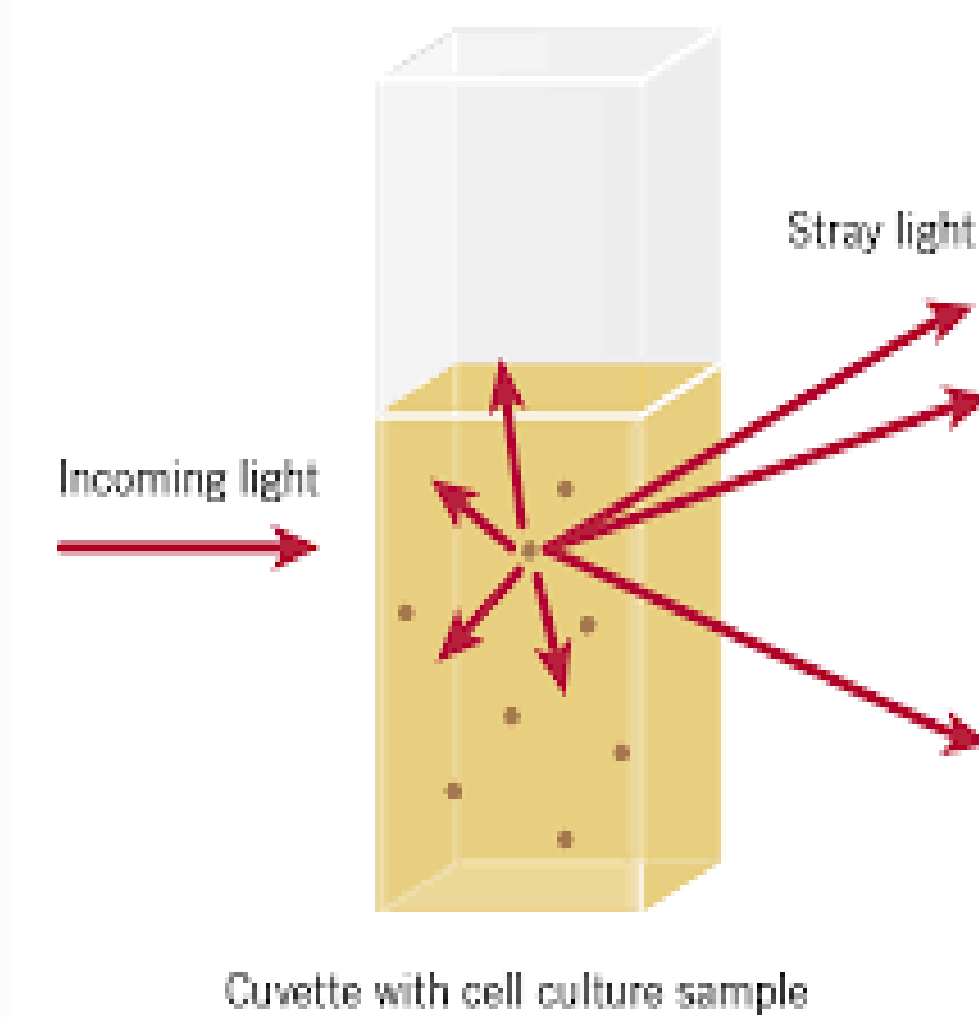
- [https://2016.igem.org/Team:Denver\\_Biolabs/Proof](https://2016.igem.org/Team:Denver_Biolabs/Proof)
- <https://cwoer.ccbcmd.edu/science/microbiology/lab%20manual/lab2/lab2.html>
- <https://www.implen.de/od600-cell-density-bacterial-growth-yeast-growth/>
- <https://doi.org/10.1002/j.2050-0416.1966.tb02977.x>

## Methods

Aseptic technique was used to place 300 mL of overnight culture in cuvettes according to temperature



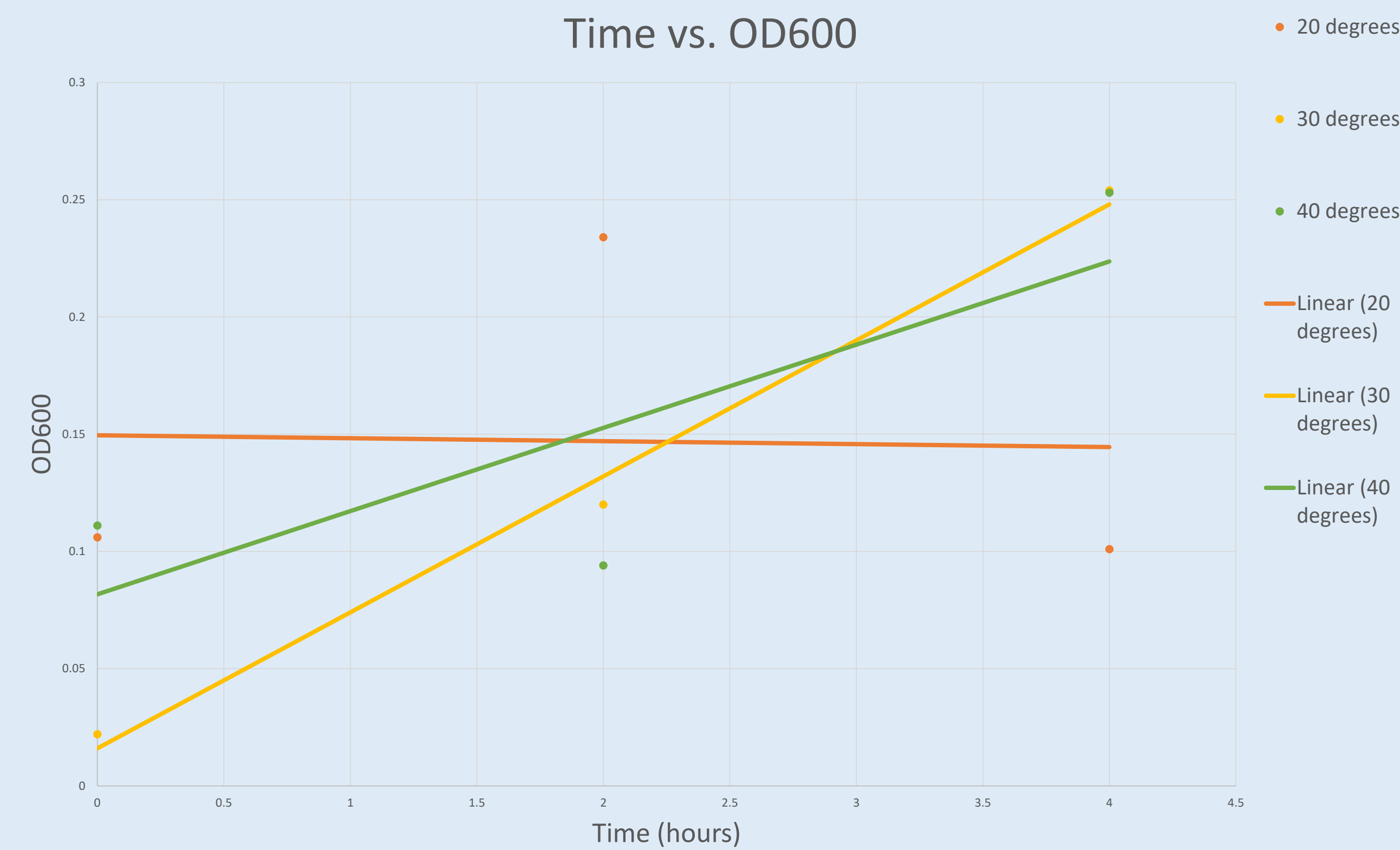
OD600 was taken every two hours.



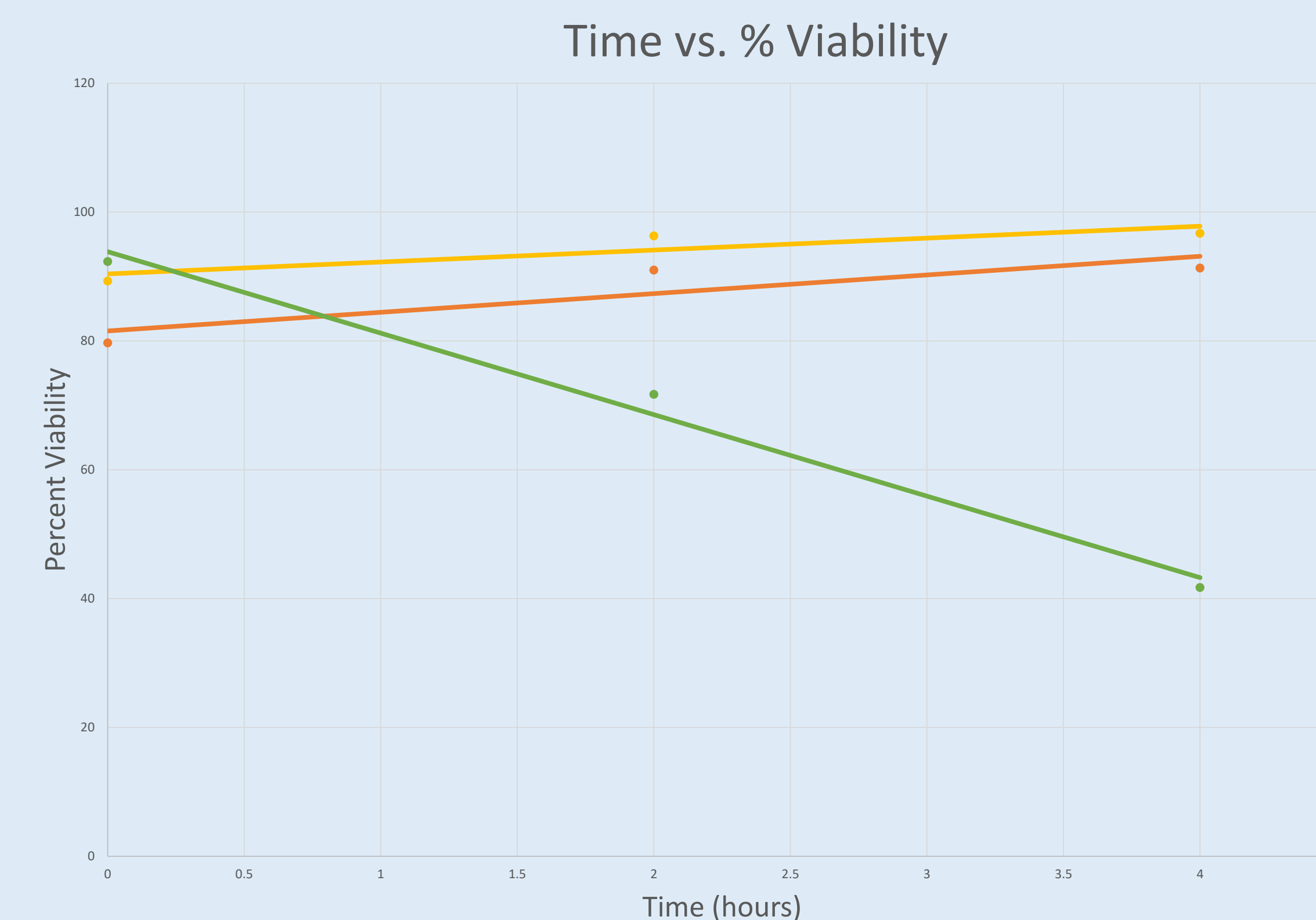
Percent viability was also taken every two hours, in which we counted live and dead cells for a total of 100 cells.



## Results



Trial 1 Results: Time vs. OD600 readings for four hours. 30 C had the highest rate of growth, followed by 40 C.



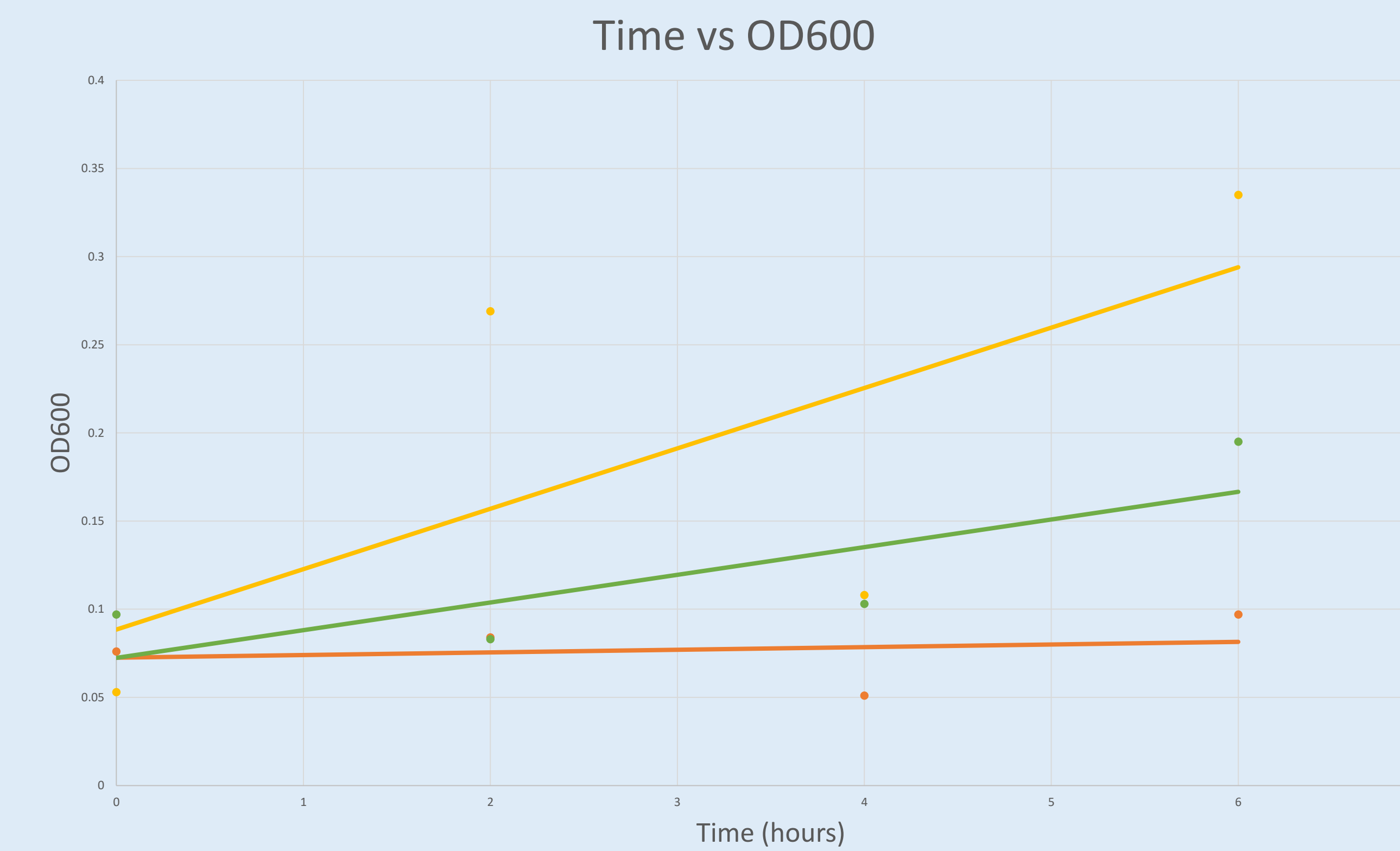
Trial 1: Time vs. Percent viability for four hours. 30 C had the highest Growing number of live cells, followed by 20 C

### T-Test result (OD600):

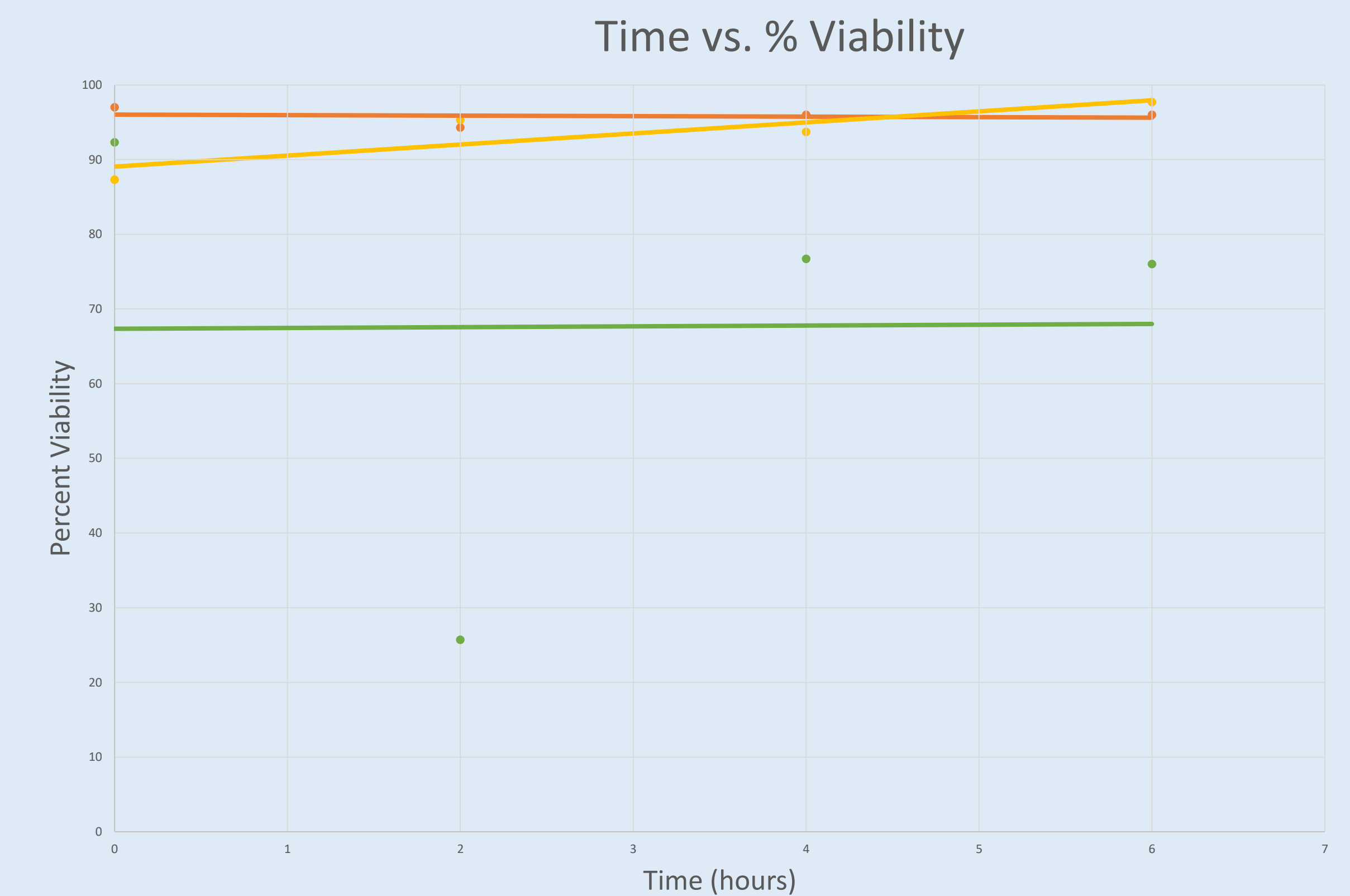
- done at timepoint: 6
- 20 C and 30 C: one-tailed 0.000101
- 30 C and 40 C: one-tailed 0.0682

### Conclusion

30 C is the optimal temperature for *S. Cerevisiae* growth, which represents eukaryotic cells. This finding allows us to understand which temperatures promote cell growth in eukaryotes, which accounts for many of the organisms in our ecosystem.



Trial 2 Results: Time vs OD600 readings for six hours. 30 C had the highest rate of growth, followed by 40 C..



Trial 2: Time vs. Percent viability for six hours. 30 C had the highest number of live cells.

Based on previous research that 35 C was the optimal temperature, and our T-test, which shows an insignificant difference between 20 C and 30 C, we can further conclude that there must be a drastic decline in growth from 35 C - 40 C. This may be an interesting topic for further study to determine the specific temperature that growth begins to decline.