

We had the idea that there must be an effect on how UV light affects yeast growth. With the initial thought that knowing alcohol is fermented in dark places, we can infer that light impacts the growth of yeast. Our data showed laws for all SPF's used and with all times we ran during the experiment, meaning our data inferred that SPF does work for the recommended 80 minutes of wear. We were hoping that yeast death would occur at 80 minutes, but our data refuted that. Although the results we got weren't the ones we were expecting, it brought up valid questions, and we ended up with a solid answer: SPF does work to protect.

### Introduction

When thinking about protecting yeast growth sunscreen is probably not the first thing that comes to mind. However they are related. Yeast can not survive when they are constantly exposed to UV light, and sunscreen protects from UV light (Tanner et al., 1934). In everyday life yeast is used in multiple ways, one being fermentation. When they are exposed to UV lights yeast do not ferment like they should (Tanner et al., 1923). Industries that rely on alcoholic fermentation for example would be in trouble if their barrel of wine was exposed to the sun. Thinking about how UV impacts yeast we came up with the research question, How do different SPF levels of sunscreen affect yeast growth? We hypothesized that higher SPF levels would allow for more yeast growth.

### Methods

#### Materials

To start with this experiment, we needed eight agar plates (petri dishes), a micropipette set to 100 microliters, three levels of sunscreen with varied brands (SPF 15, 50, 100), yeast solution, an incubator, UV light box, and a flame sterilization kit. Gloves and UV protected glasses are also needed during the experiment. The data was collected by photos and written down in a chart.

#### Procedure

After sanitizing our station, we sterilized the spreading tool using ethanol and a flame before dispersing 100 microliters of yeast solution evenly on each plate. We labeled each plate accordingly. While we are waiting for the solution to absorb into the agar, we spread (on the top covers) 15 SPF on two plates, 50 SPF on two plates, 100 SPF on two plates, and left two plates without SPF. With all the plates prepared, we take them to the UV light box and set them in there for 80 minutes. After 80 minutes, we let the plates incubate for 48 hours.

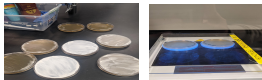


Figure 1. provide a brief description of what your figure or model is illustrating. This may be a picture that illustrates your methods, or supports your findings

# Sunscreens Effect on Yeast Growth

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### Growth of yeast with different SPF

Spf (sunscreen)	Time	Colonies	Killed%
15	80min.	Lawn	0%
50	80min.	Lawn	0%
100	80min.	Lawn	0%
No sunscreen	80min.	No colonies	100%

Table 1. Only those that do not have Spf do not have colonies, so those that killed at 100%, the same shows those that have Spf have many colonies which yeastgrowth died at 0%.

### Colonial growth of yeast in different conditions


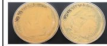
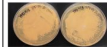

Conditions	Colonies
The plate was covered with sunscreen of SPF 100 for 80 minutes. For this the colonies could not be counted since it had many.	
The plate that was covered with 50 SPF sunscreen for 80 minutes also had many colonies, so it was not possible to count exactly how many it contained.	
The dish that was covered with 15 SPF sunscreen for 80 minutes, likewise has many colonies which contains 0% killed.	
The control plate had no colonies because it did not have SPF. for which it did not contain colonies. It was our comparison to see how the SPF had an effect.	

Figure 2. From the results, yeast cells should be protected from sunlight with sunscreen as it has an effect on yeast cells, we see how having sunscreen has 0% kill on yeast.

### Discussion

Our groups hypothesis was, higher SPF levels of sunscreen will increase yeast growth. We tested a variety of different SPF's running from a plate with no SPF, SPF 15, SPF 50, and SPF 100. We measured this with UV light for a time of 80 minutes. Using this amount of time we were hoping to see different results in yeast growth with the different variety of SPF's.

In our results we didn't see many surprises, we inferred that there would be a change in growth with these different SPF's. Although, in our results we found that all yeast with the different SPF's had created lawns at 80 minutes except for the no SPF plate. We had also done a test run beforehand with different levels of time. All SPF's still created lawns in those different amounts of time. As you can see there is almost little to no difference in the sunscreen. This proves that SPF has almost no difference in protection. "An SPF 15 sunscreen blocks 93% of UVB radiation, and SPF 30 blocks 97%. After that, the difference in protection is small. SPF 50 blocks 98%, and SPF 100 stops 99% of UVB rays from reaching your skin." (Alexander 2021) So you always know you'll be protected! After the results from our experiment we then inferred that each sunscreen will protect you with little to no difference. Our original hypothesis was then not met after our experiment but we found out new valuable information that SPF's do NOT in fact have different effects in yeast growth.

This experiment showed the effectiveness of sunscreen under intense UV light. The only limitation our group had was the time frame. With the limited amount of time we were given it did not give us a variety of results. While we may have seen some death eventually happen with time longer than 80 minutes, we did not have the time to run the plates for longer given the short time frame.

### Acknowledgements

Thanks to our instructor Lauren Maniatis and the lab staff for providing the materials to run our experiment, for their time in revising our experiment so that it could be performed more effectively in order to provide better results.

### References/ Work Cited

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