Mold Growth on Bread and Cheese

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Introduction/Significance:

For my experiment, I observed the rate of mold growth on different categories of bread and cheese. I wanted to examine whether the absence of dairy/eggs or the addition of preservatives impacted the products' ability to produce mold. Organic products usually mold faster than non-organic products because they contain fewer preservatives (Luke, 2019). Also, preservatives generally increase the acidity of bread so that it molds less quickly (Myers, 2014).

After conducting research, I hypothesized that organic food will have the largest amount of mold growth because they contain fewer preservatives that block the buildup of mold. Therefore, they are more vulnerable to bacteria.

Methods:

Before I set up my experiment, I conducted research regarding ideal conditions for the highest mold growth. According to Sciencing.com, the moisture level of bread greatly affects how quickly it molds. Wet bread molds more quickly than dry bread because mold thrives in damp environments. Wanting to accelerate mold growth, I lightly sprayed each slice of bread and cheese with water. After that, I individually placed three slices of each category into their own Ziploc bags. I put the Ziploc bags side by side in two containers and kept them in a dark storage cabinet in my room. Every week I measured the mold growth on each slice and recorded it in my data table.

Every Wednesday I took out the containers of food slices, one of which shown above, and measured the area of mold growth.

I conducted my experiment in my dorm room in Gilchrist Hall, a residence hall in MSU's West Circle Neighborhood.

Results:

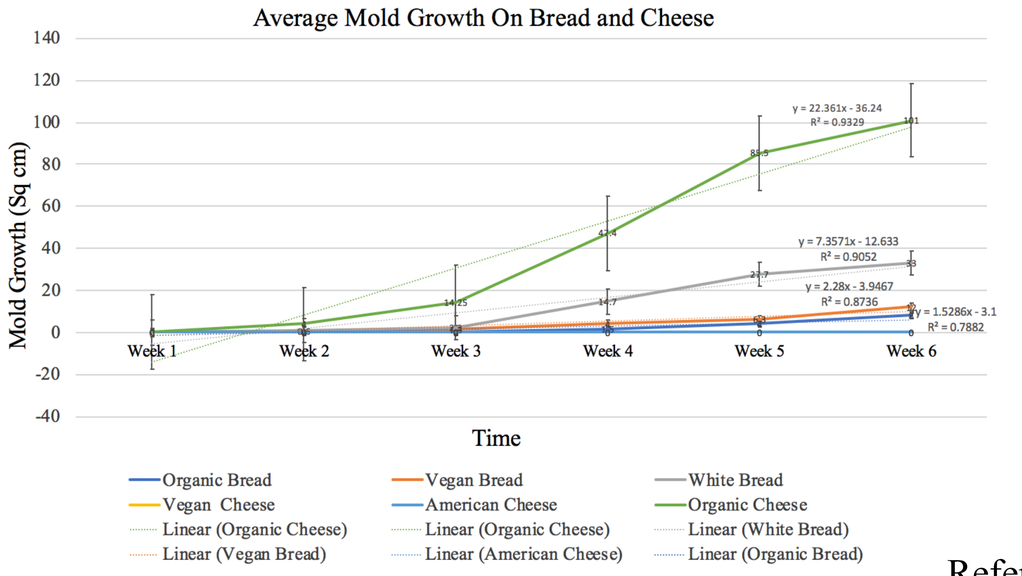
As shown in both the table and graph below, mold growth was the highest on organic cheese. This category of cheese developed an average of 101 square centimeters of mold. The vegan and American cheese did not mold, proving that they contain artificial substances that hinder mold development.

Interestingly, organic bread only formed an average of 8 square centimeters of mold over the six week long period. On the contrary, white bread had the highest rate of mold growth in the bread category with an average of 33 square centimeters of mold.

Average Mold Growth On Bread and Cheese (Sq cm)

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Standard Error
Organic Bread	0	0	0	1.5	4	8	0
Vegan Bread	0	0.6	1.3	4	6.3	12	1.863
White Bread	0	1	2.3	14.7	27.7	33	5.906
Vegan Cheese	0	0	0	0	0	0	0
American Cheese	0	0	0	0	0	0	0
Organic Cheese	0	4	14.25	47.4	85.5	101	17.683
Standard Error	0	0.636	2.287	7.571	13.652	15.859	

A completed data table of my results showing the average mold growth on bread and cheese, measured in square centimeters, over a six week time period.



This line graph shows the average mold growth on three different categories of bread and cheese over a six week period. As represented by the green line, organic cheese had the greatest amount of mold growth as well as the greatest R^2 value.

Conclusions:

After six weeks of conducting my experiment, I discovered that organic cheese has the fastest rate of mold growth out of all the food used in the experiment. On the other hand, the vegan and American cheese showed no signs of mold growth, confirming my hypothesis that increased amounts of preservatives in these products block the buildup of mold. According to Dailymeal.com, the ingredients in Kraft Singles include preservatives such as sorbic acid, an antimicrobial agent that prevents the growth of bacteria.

The bread showed opposite results compared to the cheese. White bread had the largest overall mold growth followed by vegan bread. Unexpectedly, the organic bread slices had the smallest amount of mold growth out of all the bread in the experiment, thus rejecting my hypothesis.

A suggestion I have to avoid errors during future research is to experiment on multiple different brands of bread and cheese from each category being tested. The higher number of food products used in the experiment will allow for more accurate data. Also, if the experimenter wants to make the products more moist, it's crucial to measure out equal amounts of water to spray on each product in order to ensure equal conditions for each product. After all, if one piece of bread is more moist than the others, that slice will show accelerated mold growth which will impact the accuracy of the experiment.

References:

Luke, Marianne. "Which Breads Mold Faster?" *Sciencing*, 2 Mar. 2019, sciencing.com/breads-mold-faster-8052755.html.

Myers, Dan. "How Long Does Kraft Cheese Last?" *The Daily Meal*, 26 Aug. 2014, www.thedailymeal.com/how-long-does-kraft-cheese-last.