

Expired Food Kills the Mood



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Can we consume food after its expiration date?

Does food expire at the same rate in the fridge as it does in room temperature?

Topic Questions

Hypothesis

I think that food expires at a faster rate when its outside in room temperature than it does in the fridge because the cold temperature that the fridge maintains will prevent the fungal growth.

Prediction

If I let food, go past its expiry date both in room temperature and in the fridge the food in the fridge will have less fungus .

Independent Variable

Temperature and humidity of the environment (fridge, counter, inside cupboard, beside sink)surrounding the food. I will collect this in degrees celsius using a thermometer. I will measure the humidity using a hydrometer app and the units for that will be g/kg.

Dependent Variable

Seeing the amount of fungal growth that has been grown onto each of the foods in each location. This will be measured with a ruler in centimeters every three days.

Controlled Variable

The type of food that is used in each test (bread, cheese, salad mix). Intervals that they are photographed at (everyday at 5pm). Temperature in each location will remain constant (same room temp, same fridge temp, same cupboard temp).

Background Research

- My big topic is Food waste due to expiration date.
- How we can reduce food wastage. In this society, people dispose products that are still consumable to humans.
- Most of the time the expiration dates are used for sales tactics so you will throw away the “expired” food and buy more from the store.
- People don't know is when you waste food it goes to the landfill and the landfill produces methane which is a greenhouse gas that affects are ozone layer.
- I want to experiment how far after expiry date people can consume food, educating the consumer into keeping the product until its detrimental to our health.

Background Research Con't

- Sometimes people throw food as soon as they reach expire without judging with five senses. Retailer sometimes move product from shelves to maintain freshness and quality product in the store.
- My research answers that even when the food might say that it expires on the box it is still not detrimental to human health and is still consumable while the product may last longer when it's in the fridge due to the cold temperatures inside of it.
- Instead of that people discard the product just as it reaches the expiry date which causes food waste and more sales from the store that has that product because people are throwing out edible food and buying more from their store.

Materials

- 4 slices of bread (Founder's and Farmer's brand)
- 4 slices of cheese (Cracker Barrel)
- Handful of salad mix
- 12 Ziploc bags
- 12 sticky notes
- Pen/pencil
- Ruler

*Note: all produce should be reaching it's expiry date

Procedure

- Measure the temperature and humidity in each location and ensure that they are different
- Take four slices of expired white bread, four slices of cheese, and some salad mix
- Place each one in a ziploc bag (12 bags total)
- Place one of each item (one piece of bread, piece of salad, one piece of cheese) in a cool dry area (inside cabinet)
- Do the same with three bags of each item in room temperature (countertop)
- Do the same with the three bags of each item in a cold area (fridge)
- Do the same with the three bags of each item in a warm moist area (sink)
- Label them by what area they are in and the date it expired.
- Observe the fungal growth daily for 20 days by taking pictures at interval at of each same time and measuring the growth with a ruler

Results

Table #1: Quantitative Data of the Radial Growth of Fungus on Bread in Each Environment Inside fridge temperature 2 degree celsius and room temperature 21 degree celsius. Humidity - 53% g/kg. Expiration date-20 th January,2024.

Observation day	Cool dry area in cm	Warm moist area in cm	Room Temp in cm	Inside fridge in cm
1-3	0	0	0	0
4-7	0	0	0	0
8-10	0	1	0.2	0
11-13	0.5	3	1.5	0
14-16	1	5	2.1	0
17-19	1.3	6.5	2.5	0

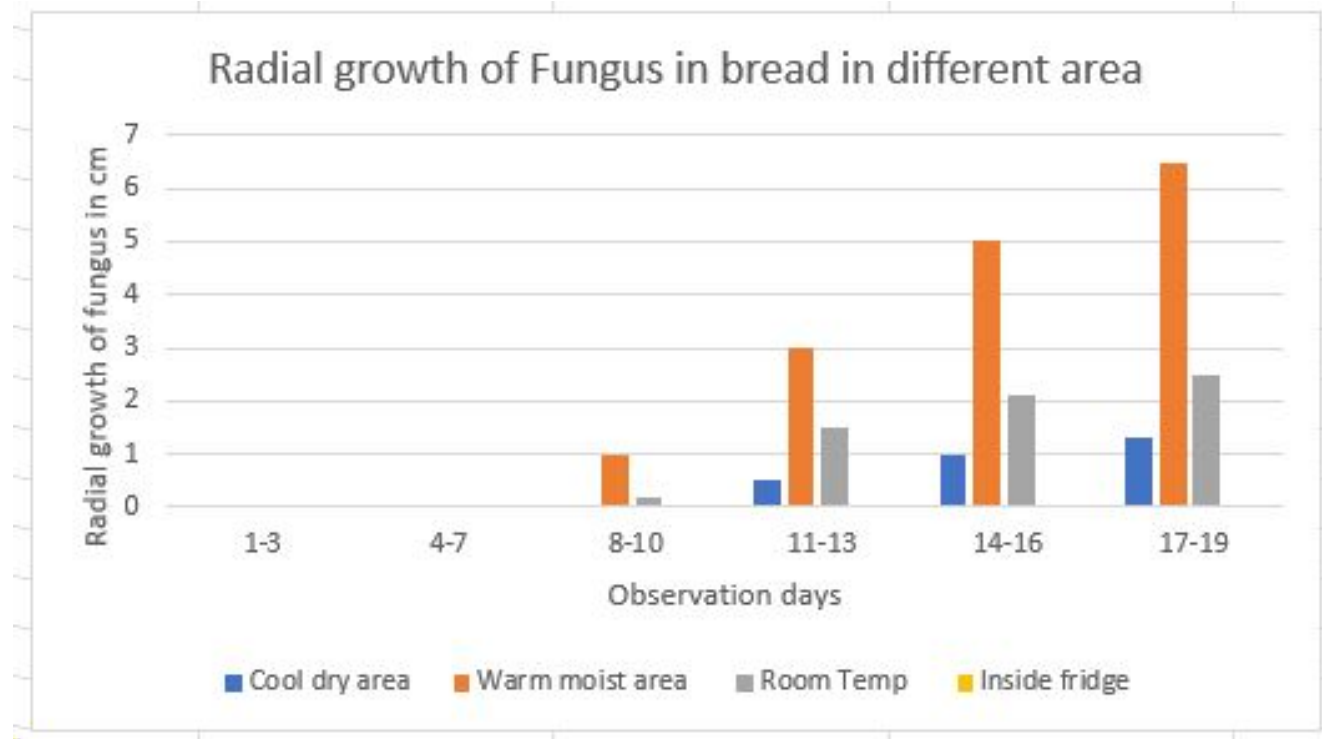


Figure #1: Bar Graph of the Radial Growth of Fungus on Bread in Each Environment. Inside fridge temperature 2 degree celsius and room temperature 21 degree celsius. Humidity - 53% g/kg. Note- inside Fridge is zero. Expiration date 20 th January,2024



Growth of fungus in bread in different environments (room temp, fridge, cool dry, and moist areas)

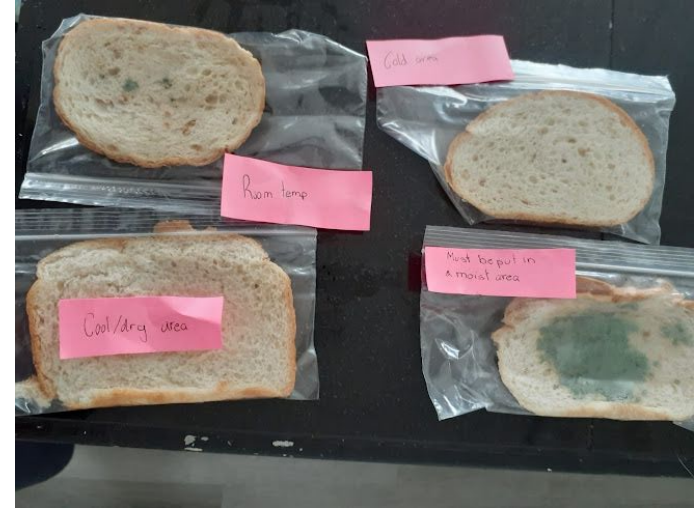


Table #2: Quantitative Data of the Radial Growth of Fungus on Cheese in Each Environment. Inside fridge temperature 2 degree celsius and room temperature 21 degree celsius. Humidity - 53% g/kg. Expiration date- 2nd january, 2024

Observation day	Cool dry area in cm	Warm moist area in cm	Room temp in cm	Inside fridge in cm
1-3	0	0	0	0
4-7	0	0	0	0
8-10	0.5	1	0	0
11-13	1.8	1.7	0.1	0
14-16	2	2	0.9	0
17-19	2.7	2.7	1.2	0

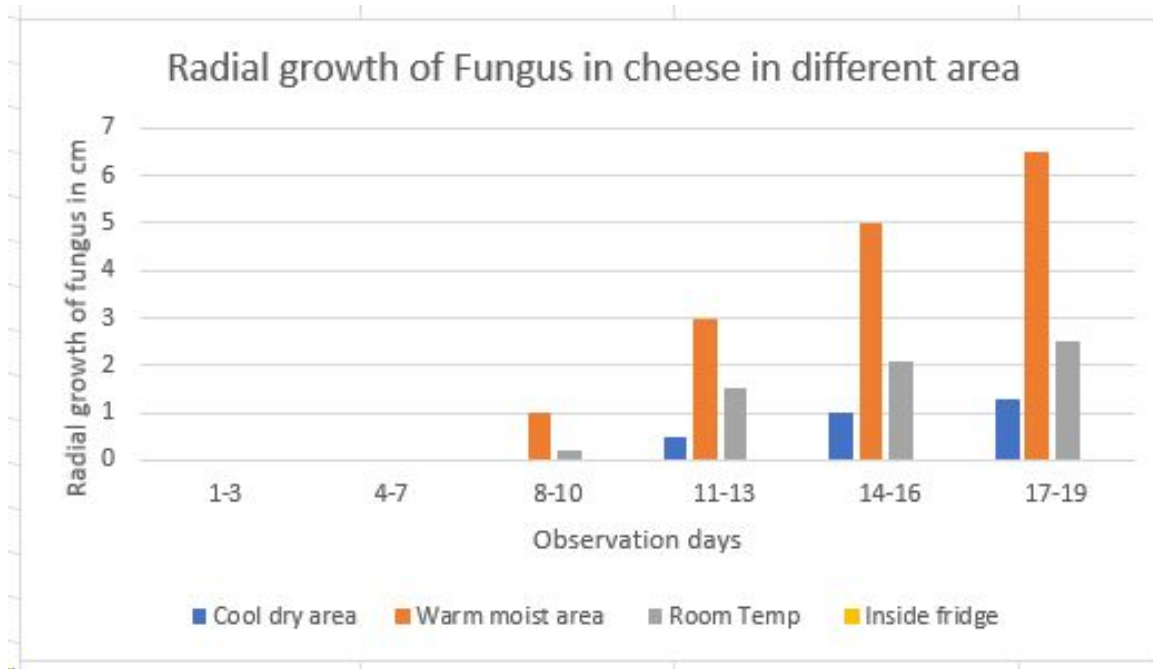
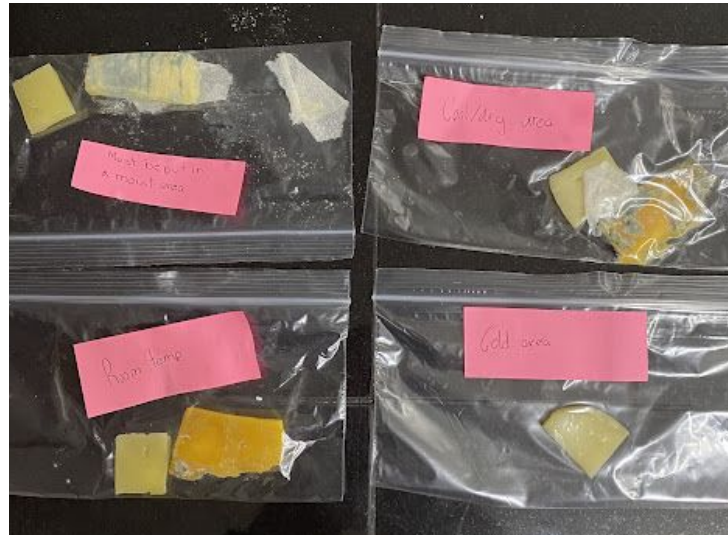


Figure #2: Bar Graph of the Radial Growth of Fungus on Cheese in Each Environment. Inside fridge temperature 2 degree celsius and room temperature 21 degree celsius. Humidity - 53% g/kg. Note- Inside fridge was zero. 2nd January, 2024



Growth of fungus in cheese in different environments (room temp, fridge, cool dry, and moist areas)

Table #3: Quantitative Data of the Radial Growth of Fungus on Salad Mix in Each Environment. Inside fridge temperature 2 degree celsius and room temperature 21 degree celsius. Humidity - 53% g/kg. Expiration date- 20 January,2024.

Observation day	Cool dry area in cm	Warm moist area in cm	Room temp in cm	Inside fridge in cm
1-3	0	0	0	0
4-7	0	0	0	0
8-10	0	0	0.2	0
11-13	0.5	1	0.4	0
14-16	1	1.5	1	0
17-19	1.5	2	1.7	0

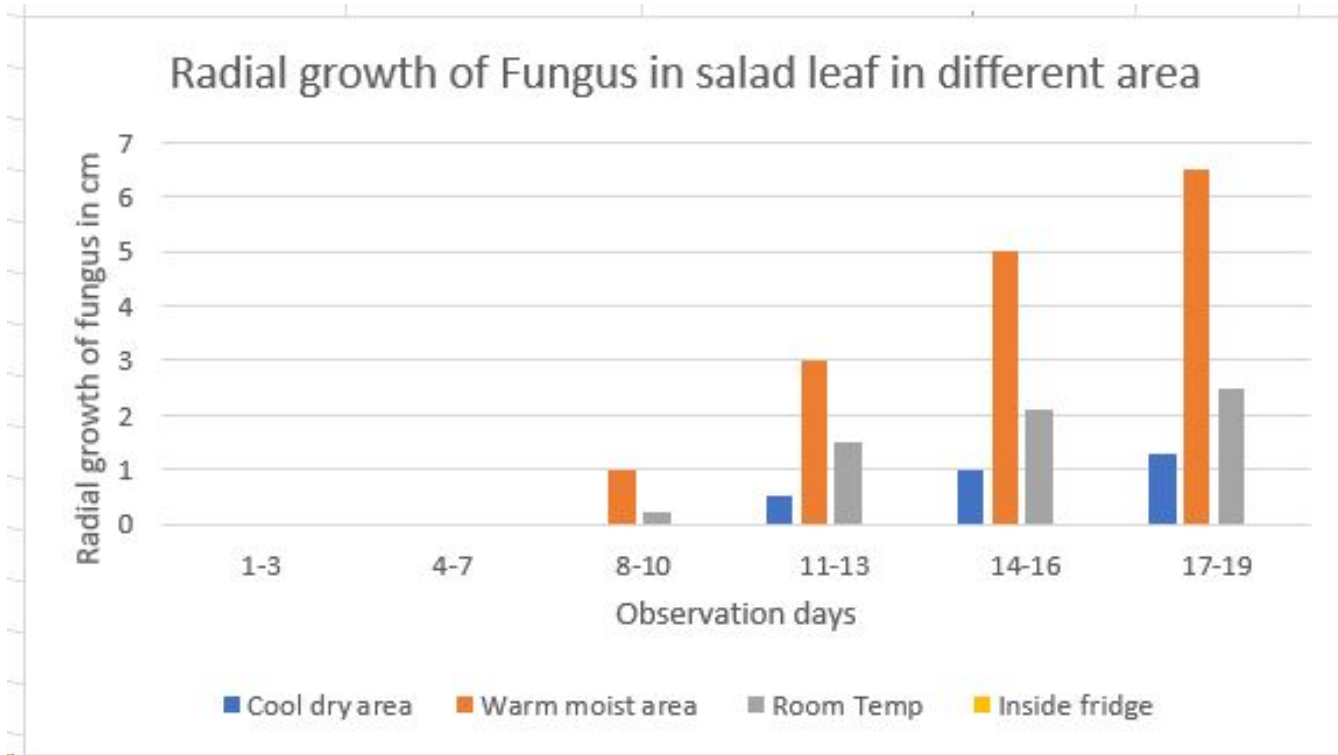


Figure #3: Bar Graph of the Radial Growth of Fungus on Salad Mix in Each Environment Inside fridge temperature 2 degree celsius and room temperature 21 degree celsius. Humidity - 53% g/kg. Note- inside fridge was zero.Expiration date- 20 January,2024.



Growth of fungus in salad leaf in different environments (room temp, fridge, cool dry, and moist areas)

Conclusion

- You can still consume food after its expiry date.
- After 7 days of expiration date, you can still consume bread if you put that in room temperature.
- If you put bread inside fridge, you can still eat bread up to 2 weeks or more.
- If you keep the bread in moist or room temperature area the more fungus will grow after expiration date.
- If salad leaf is kept inside fridge after expiration date then it will stay fresh with no spoilage up to two weeks or more.
- If left outside, it will spoil after 7 days or so.
- If you keep cheese after expiration date, inside fridge up to two week it will be fresh to eat.
- In moist area and room temperature fungus will grow in cheese 8 to 10 days.
- My hypothesis was correct because I had predicted that we can still consume food even after expiration date if properly stored.

Next Steps

- I would try to experiment with other foods like canned food or some raw food.
- How many days does it take for the mold to completely cover the product in the fridge.
- How much stores use expiration date or used by date as sales tactic.
- I want to conduct this experiment at an earlier time so I could experiment more.
- Look at the bacteria.

Fun Facts About Food Waste

- According to estimates, more than half of Canada's food supply is wasted annually and \$49.5 billion of that wasted food is avoidable. Food is wasted from farm to plate, through production, processing, distribution, retail, food-service and at home.
- Canadians create over 50 million tonnes of food waste every year despite 60% of it being avoidable through better planning and awareness.
- The average Canadian household produces 79 kilograms of food waste per year according to the UN Food Waste Index.
- 47% of food waste in Canada is generated at the household level.

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Thank You

Mr. Rip

Mr. Klassen

My parents and my sister