Sciencejournalforkids

Sunday, December 15, 2024

Hypothesis: I believe that washing the rice until the water is clear will be the most effective option, since if the water has no dirt or cloudiness, it indicates that the rice is almost to completely clean.
While 0 washes gives me an idea that the rice will still have specks of dust or even some other unwanted microorganisms.

Saturday, December 28, 2025

Many people in the world eat rice as part of their diet. But when we do, we often wash our rice. Some like to wash it once, or until the water is completely clear. The goal of this project is to see if washing rice is really necessary. If not, then more water can be saved and be used for other important things.

Wednesday, January 22, 2025

Today, I tested out the microscopes at school using the help of one of the science teachers, Mr. Thompsons. Today was just to see how microscopes work so that in the future, I know how to use a microscope without any struggle.
Examples of the pictures I took today:

Wednesday, January 29, 2025

Controlled variables
-1 cup of rice (will input type of rice later)
-Sufficient amount of water for rice to cook
-Type of rice cooker
-How long I will cook the rice for
-Type of microscope
-Type of petri dish

Manipulated/independent variable
-The amount of times I washed the rice

Responding/dependent variable
-Different cleanliness of the rice (Under a microscope and a petri dish.)

Hypothesis (!), problem (!), variables (!), procedure, observations, data, conclusion, applications, sources of error, acknowledgements (?), declarations, short video, images.

Current acknowledgements:
Mr. Thompsons - for providing guidance, assisting me to buy a tri-fold, and frequently checking in with us to make sure our projects are going well.
Charvi - For providing me emotional help throughout this entire project. I felt alone at times during my project, yet she was there for me. Even though it may have just been a few kind words, it helped me get through it.

Procedure

1. Gather materials for steps 1-2 (rice, rice cooker, and water)
2. Wash the different sets of rice once (sample 1), twice (sample 2), five times (sample 3), and until the water is clear (sample 4)
3. Gather materials for step 4-6 (Petri dishes, gloves, cotton swabs, different rice samples)
4. Put on gloves to make sure the tests are accurate
5. Use the cotton swabs to get a sample of the rice and gently streak the swab against the petri dish
6. Properly seal and label the petri dishes
7. Incubate the petri dishes so that we can see the bacteria properly grow

8. Bring the different types of rice samples so that we can see the rice under a microscope
9. Observe the rice under a microscope and take pictures of each sample.
10. Check if the petri dishes have grown any bacterial colonies.
11. Observe the different petri dishes and take pictures of each one.
12. Add observations
13. Add data
14. Add conclusions and check if my hypothesis was correct or incorrect

Procedure for microscope testing

1. Gather materials for steps 1-2 (rice, rice cooker, and water)
2. Wash hands each time thoroughly before washing the rice to not add any other bacteria to the samples
3. Wash the different sets of rice once (sample 1), twice (sample 2), five times (sample 3), and until the water is clear (sample 4)
4. Cook the rice using the same amount of water and time to ensure a fair experiment
5. Make sure to wash the rice cooker to make sure the previous sample will not interfere with the next one (repeat for each sample)
6. Gather materials for steps 7-10 (telescope, gloves, all rice samples, phone, plastic bag)
7. Put the rice samples into different bags for each sample
8. Bring the rice samples to school to access the microscopes
9. See the rice samples under a microscope using a glove to place it on the glass dish to avoid adding unnecessary bacteria to the rice
10. Take pictures of the different rice samples that are under the microscope to observe
11. Observe each magnified view of the rice samples

Procedure for petri dish testing

1. Gather materials for steps 1-2 (rice, rice cooker, and water)
2. Wash hands each time thoroughly before washing the rice to not add any other bacteria to the samples
3. Wash the different sets of rice once (sample 1), twice (sample 2), five times (sample 3), and until the water is clear (sample 4)

4. Cook the rice using the same amount of water and time to ensure a fair experiment
5. Make sure to wash the rice cooker to make sure the previous sample will not interfere with the next one (repeat for each sample)
6. Gather materials for steps 7- (petri dishes, all rice samples, phone, gloves, cotton swabs)
7. Use a cotton swab to get a sample of the rice
8. Use a brand new cotton swab each time I use a different sample of rice
9. Use the cotton swab to gently streak it on the petri dishes using a zig-zag pattern
10. Repeat this process until all of the samples have been collected into the petri dishes
11. Write the date, seal, and label each of the petri dishes (Example: February 2nd, 2025. Sample #3)
12. Put the petri dishes into an incubated space (For bacterial growth is 25 degrees celsius)
13. Check up on the samples regularly to see if there is any bacterial growth.
14. Once, there is bacterial growth, take a picture of each petri dish
15. Observe each sample

Saturday, Feb 1, 2025

Research - How much water is used when we wash rice (on an average)?

Many people wash their rice about 4-5 times. That is equivalent to about litres. Others like to wash their rice until the water is perfectly clear. The amount of water can depend on how much rice is being cooked. We can see that a large amount of water is being used to just wash rice.

Website 1: 4-5 times
Website 2: 3-4 times
Website 3: 5 times
Website 4: Until the water is clear (approximately 6-7 times)
The average amount of time rice is washed is about 5 times, which is approximately 2.5-3.75 liters of water. Rice is the most eaten food in the world. So large amounts of water is used just to wash rice.

Monday, February 3, 2025

Purchased petri dishes (Includes 20 petri dishes, necessary amount of agar powder to make 600mL of agar solution, 20 sterile cotton swabs).

Additional acknowledgements: Sarah's mom - Thank you for helping me purchase the petri dishes.

Tuesday, February 6, 2025

Research topic - What kinds of impurities are there on unwashed rice?
-Bacillus cereus bacteria
-Starch
-Dust
-Dirt
Bacillus cereus bacteria can cause vomiting/gagging, diarrhea/defecation, and nausea.

You will want to wash your rice since dust, dirt, and starches can be left on the rice. If you clean the rice, these impurities can be avoided, since rinsing your rice can carry away the impurities.

Friday, February 7, 2025

The application for this project is to see if washing your rice is really necessary. Many people around the world eat rice on a daily basis. Much water is used just for when rice is being washed. So conserving your water and not wasting it is important. If washing your rice is unneeded, large amounts of water can be saved. If washing your rice *is* important, we need to see what kinds of effects it can have on you if any impurities are left on the rice. By seeing the impact of different amounts of time the rice is washed, we can see a clearer picture of whether this habit is truly needed or not.

Monday, February 10, 2025

On unwashed rice, there are starch residues left on it after harvesting and drying. Washing your rice can help remove the access starch that has been collected.
Based on my research, pesticides are used in rice fields, which can lead to rice having pesticides in them.
-Washing your rice can remove significant amounts of pesticides (ranging from 12% - 88%). It washes the pesticides off of the rice's surface and can make it more hygienic compared to if you don't wash it. Small amounts of pesticides will not harm you or your

body, and have very mild effects like dizziness, headaches, or irritation in your body. But when large amounts of pesticides are consumed, it will have worse effects on you like: vomiting, coughing, and cramps. Washing your rice can help reduce the amounts of pesticides in the rice that you consume daily.

Wednesday, February 12, 2025

Learned how to use a petri dish

1. Create the agar solution by adding the powder into water
2. Microwave the agar solution for 4 minutes in the microwave
3. Then, pour the agar solution into into the petri dish
4. Wait for it to solidify
5. Once it is solidified, use a clean cotton swab to collect the bacteria sample from the rice
6. Put it in a safe place and wait for bacteria to grow

Thursday, February 13, 2025

-Bacillus cereus can get into rice by its spores. The bacteria can be found in the soil that the rice is grown in, in which it can contaminate the rice. It can survive harsh conditions, like boiling temperatures. The active bacteria can be killed off, but the dominant spores can still remain in the rice.
-But when you wash the rice, it can remove most of the bacteria away. Bacillus cereus can stick to the surface of the rice grains. When you wash it, it rinses off the spores and bacteria away. The more you wash the rice, the more bacteria washes off.
-Also, bacteria is more likely to spread when starches are near it. Washing your rice additionally removes starches that are potentially on the rice you consume.
-Consuming bacillus Cereus can cause vomiting, nausea, and diarrhoeal syndrome

Saturday, Feb 15, 2025

-Things Bacillus Cereus is resistant to: heat and drying
-It has a rapid growth rate, especially in starchy foods like rice. That’s why it’s more preferable to wash your rice, and to do it often so that more bacteria, starches, dust, and other microorganisms cannot spread

Monday, Feb 17, 2025

Questions that would be asked at the science fair

How I came up with this experiment:
-When it was the time to choose a topic for the CYSF, coincidentally, I saw my mother washing rice. I had other experiments in mind as well, but when I saw her washing the rice, I thought about it as well.
-When choosing my science fair project, I asked for some guidance from Mr. Thompsons to see which one would be the best options, washing rice was one of them.
-In the end, I decided to choose washing rice.

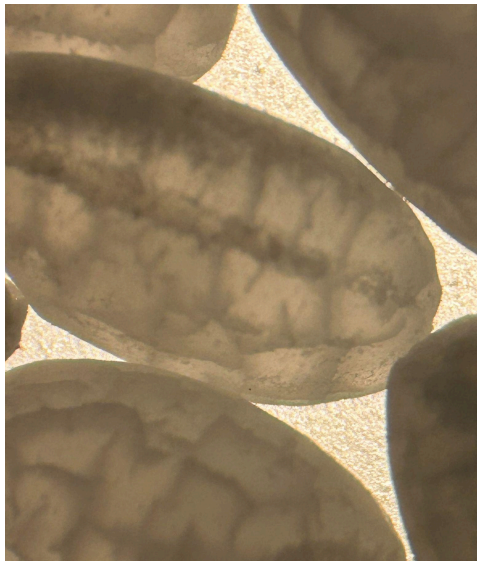
Feb 18, 2025

-Does washing your rice really have an Importance and how clean can it get? Will it have any effect on you?
-The Importance of Washing your Rice and Seeing the Effects it can have on You.
-Does Washing your Rice have an Importance and can it have any Impacts on You?

-In this experiment, I will be testing different washing methods for rice and see if there are any differences. Then, using a microscope, I will be seeing if there are any dust particles, damages, (possibly cells), etc., and see which method is the best.
-This science project aims to see if washing your rice different amounts of times will have different amounts of bacteria using a microscope and petri dishes, while seeing if the bacteria in rice can harm your body.

Wed, Feb 19, 2025

How unwashed, dry rice looks like:

Wednesday, March 5, 2025

Why do people wash their rice?
-Some individuals wash their rice

March 7, 2025

Sources of error/things I would do differently next time:

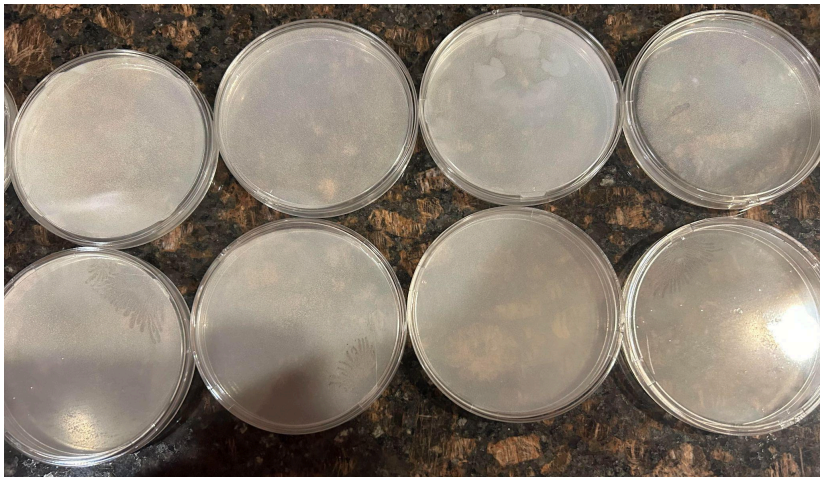
Sources of error:
-There might have been different amounts of agar solution in each petri dish, causing the results to be slightly altered.
-

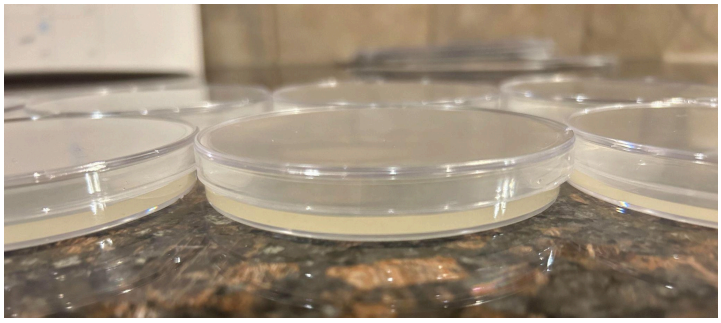
Things I would do differently next time:
-Add more variants of rice to see if the results are still the same (Ex. jasmine rice, brown rice, basmati rice)

March 14, 2025

I've used the nutrient agar powder (16 grams) and boiled it with 750mL of water in order to create a nutrient agar solution. Then, I put the nutrient agar solution into the petri dishes. Once I had finished, I waited for them to solidify.

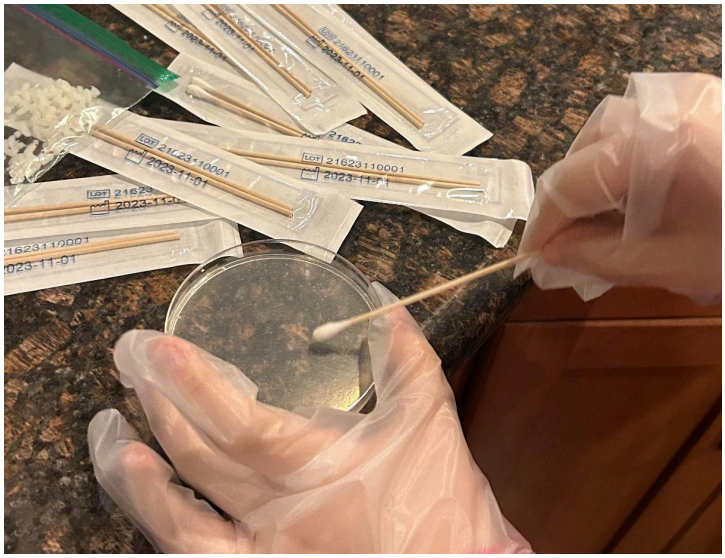

Nutrient Agar



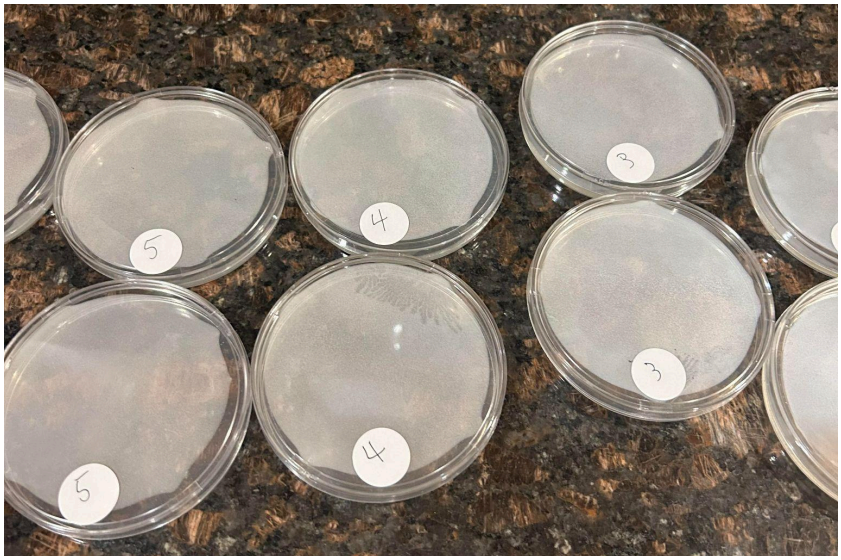


March 15, 2025

Today, I’ve swabbed the rice samples and inputted them into the petri dishes with nutrient agar solution. Once completed, I put them upside down and used a heater to provide enough warmth for the bacteria of the rice samples to grow properly.


LOT 21623110001
2023-11-01


Mar 15
2025



March 16, 2025

Observations:

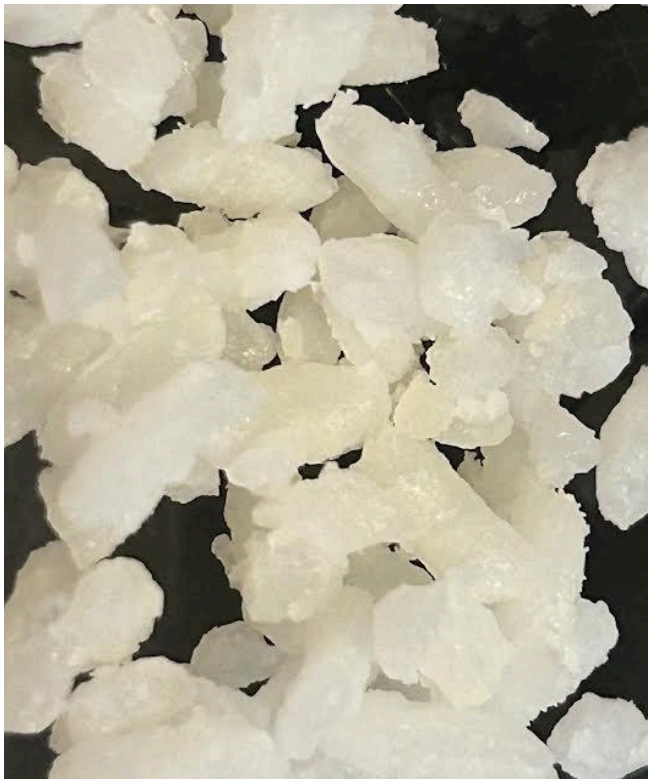
No washes:

1 wash:

2 washes:

3 washes:

4 washes:



5 washes:

Washed until the water was clear:

0. My immediate reaction was that for the rice that had no washes, there were some impurities on some of the rice grains. This can be due to the fact that it was not washed, leaving dust on the rice that can be easily consumed.

1. When we look into the rice batch that has only been washed once, we can see that there is a piece of a miniscule hair. There is also a patch of starch on one of the rice grains.

2. For the rice sample that has been washed twice, we can analyse that there is also a small amount of starch on one of the rice grains. Otherwise, there is not a big difference from the rice batch that has only been washed once.

3. If we take a closer look at the picture taken, there is a particle of dust on one of the grains.

4. As we can see, there are no impurities that are visible to the human eye. Though the texture is very grainy. This can be due to carelessness of how vigorously I have washed the rice grains. If we look closer, there are some yellow blemishes on some of the rice grains. It can be inferred that those specks are carbohydrates.

5. The rice sample that has been washed five times, is visibly free from any impurities. We can clearly see that the rice has been thoroughly rinsed, leaving the rice grains clean to the eye.

Until clear: When washed until the water was clear, the rice batch is seen with no residues whatsoever. This washing process effectively removes almost, if not all of the impurities, leaving the rice batch clean of starch, dust, and starches to the eye.

Based on these observations, we can conclude that washing your rice differently each time can make the cleanliness of the rice vary. The rice sample that has only been washed once has the most impurities, such as dust particles, dirt, and even a miniscule hair. This can be harmful if consumed. After one wash, the rice still showed signs of impurities, showcasing some leftover starches and other contaminants. Moreover, as we increased the amount of times the rice had been washed, the rice became cleaner, which each time resulted in less and less visible traces of starches and dust. By the time I washed the rice five times, no impurities were spotted. When observing the rice that was washed until it was clear, it was completely free from visible impurities. This shows the importance of washing your rice thoroughly, so that you can avoid consuming contaminants and other impurities that are visible to the human eye.

Citations

https://www.simplyrecipes.com/how-to-rinse-rice-5667473 - Saturday, Feb 1, 2025 -
https://www.epicurious.com/expert-advice/do-you-need-to-rinse-your-rice - Saturday, Feb 1, 2025 -
https://www.americastestkitchen.com/articles/3946-do-you-really-need-to-rinse-your-rice - Saturday, Feb 1, 2025 -
https://www.inverse.com/science/wash-your-rice - Saturday, Feb 1, 2025 -
https://www.agcequipment.com.au/blog/worlds-most-eaten-food/#:~:text=Rice%20is%20the%20staple%20food,the%20world's%20most%2Deaten%20food. - Saturday, Feb 1, 2025 -

https://www.mpi.govt.nz/food-safety-home/food-poisoning-symptoms-causes/bacillus-cereus-bacteria-rice-starchy-food/#:~:text=Bacillus%20cereus%20is%20a%20bacterium,and%20ways%20to%20avoid%20illness. - Thursday, February 6th, 2025-

https://www.marthastewart.com/8161974/why-wash-rice-before-cooking - Thursday, February 6th, 2025 -
https://www.ncbi.nlm.nih.gov/books/NBK459121/#:~:text=Bacillus%20cereus%20is%20a%20facultatively,nausea%2C%20vomiting%2C%20and%20diarrhea.- Thursday, February 6th, 2025-
https://www.sciencealert.com/yes-you-should-wash-rice-but-not-for-the-reason-you-think - Thursday, February 6th, 2025 -

https://marjaangroup.com/en/blog/pesticide-residues-in-rice - Monday, February 10, 2025- !!!!!!!!
https://iopscience.iop.org/article/10.1088/1755-1315/379/1/012008/pdf#:~:text=Pesticides%20Used%20in%20Rice%20Crops%20The%20aiming%20of%20pesticides%20used,order%20to%20preserve%20the%20crops. - Monday, February 10, 2025 - !!!!!!!!!!
https://pmc.ncbi.nlm.nih.gov/articles/PMC5985175/#:~:text=The%20results%20showed%20that%20washing,major%20factor%20for%20residue%20reduction. - Monday, February 10, 2025 - !!!!!!!!!!
https://www.ccohs.ca/oshanswers/chemicals/pesticides/health_effects.html - Monday, February 10, 2025 -
https://millionmarker.com/blogs/blog/is-it-okay-to-not-soak-rice#:~:text=While%20washing%20or%20soaking%20rice,be%20harmful%20to%20human%20health. - Monday, February 10, 2025 -

https://www.youtube.com/watch?v=JIZ7lj3y4MQ&t=51s - Wednesday, February 12, 2025 -

https://pmc.ncbi.nlm.nih.gov/articles/PMC1538741/#:~:text=for%20these%20strains.-,Of%20the%2042%20bifidobacterial%20strains%20tested%2C%2019%20were%20capable%20of,dentium%20strain%2C%201%20B. Thursday, February 13, 2025 -

http://www.bccdc.ca/health-info/diseases-conditions/bacillus-cereus Thursday, February 13, 2025-

https://www.worldometers.info/food-agriculture/pesticides-by-country/ - Fri, Feb, 14, 2025 !!!!!!!!!!

Lin, I. (2024, August 12). *How to Rinse Rice.* Simply recipes. https://www.simplyrecipes.com/how-to-rinse-rice-5667473

Yam, G. (2022, September 23). *Do You Need To Rinse Rice?* Epicurious. https://www.epicurious.com/expert-advice/do-you-need-to-rinse-your-rice

Phillips, S. (2021, October 2021). *Do You Really Need to Rinse Your Rice?* America's Test Kitchen. https://www.americastestkitchen.com/articles/3946-do-you-really-need-to-rinse-your-rice

Wells, F. (2021, December 13). *Should you wash your rice? The scientific method has nothing to do with the texture.* Inverse. https://www.inverse.com/science/wash-your-rice

World's Most Eaten Food Discovered: What is our favourite?: AGC Equipment. (2022, December 18). AGC Catering Equipment. https://www.agcequipment.com.au/blog/worlds-most-eaten-food/#:~:text=Rice%20is%20the%20staple%20food,the%20world's%20most%2Deaten%20food

Aotearoa, H. K. (2023, July 19). *Bacillus cereus bacteria in rice and other starchy food: NZ Government.* NZ Government. https://www.mpi.govt.nz/food-safety-home/food-poisoning-symptoms-causes/bacillus-cereus-bacteria-rice-starchy-food/#:~:text=Bacillus%20cereus%20is%20a%20bacterium,and%20ways%20to%20avoid%20illness -

Nunez, K. (2023, June 16). *Yes, You Should Wash Rice Before Cooking It-Here's How.* Martha Stewart. https://www.marthastewart.com/8161974/why-wash-rice-before-cooking

National Library of Medicine. (2023, January 23). *Bacillus Cereus.* StatPearls [Internet]. https://www.ncbi.nlm.nih.gov/books/NBK459121/#:~:text=Bacillus%20cereus%20is%20a%20facultatively,nausea%2C%20vomiting%2C%20and%20diarrhea

Mantzioris, E. (2023, June 13). *Yes, You Should Wash Rice, But Not For The Reason You Think.* ScienceAlert. https://www.sciencealert.com/yes-you-should-wash-rice-but-not-for-the-reason-you-think

Marjaan khatam. (N.D.). *Pesticide Residues in Rice.* Pesticide Residues in Rice. https://marjaangroup.com/en/blog/pesticide-residues-in-rice !!!

https://iopscience.iop.org/article/10.1088/1755-1315/379/1/012008/pdf#:~:text=Pesticides%20Used%20in%20Rice%20Crops%20The%20aiming%20of%20pesticides%20used,order%20to%20preserve%20the%20crops

National Library of Science. https://pmc.ncbi.nlm.nih.gov/articles/PMC5985175/#:~:text=The%20results%20showed%20that%20washing,major%20factor%20for%20residue%20reduction !!!

Canadian Centre for Occupational Health and Safety. (2024, May 10). *Pesticides - Health Speaks.* Canadian Centre for Occupational Health and Safety. https://www.ccohs.ca/oshanswers/chemicals/pesticides/health_effects.html

Staff, M. M. (2024, June 24). *Is Soaking Rice Necessary? Why and How to Soak and Rinse Rice.* Million Marker. https://millionmarker.com/blogs/blog/is-it-okay-to-not-soak-rice#:~:text=While%20washing%20or%20soaking%20rice,be%20harmful%20to%20human%20health

DIY bama. (2019, January 5). How to Grow Bacteria. Youtube. https://www.youtube.com/watch?v=JIZ7lj3y4MQ&t=51s

National Library of Medicine. (2006, August). *Screening for and identification of starch-, amylopectin-, and pullulan-degrading activities in bifidobacterial strains.* Applied and environmental microbiology. https://pmc.ncbi.nlm.nih.gov/articles/PMC1538741/#:~:text=for%20these%20strains.-,Of%20the%2042%20bifidobacterial%20strains%20tested%2C%2019%20were%20capable%20of,dentium%20strain%2C%201%20B

BC Centre for Disease Control. (N.D). *Bacillus Cereus.* BC Centre for Disease Control.http://www.bccdc.ca/health-info/diseases-conditions/bacillus-cereus -

https://iopscience.iop.org/article/10.1088/1755-1315/379/1/012008/pdf#:~:text=Pesticides%20Used%20in%20Rice%20Crops%20The%20aiming%20of%20pesticides%20used,order%20to%20preserve%20the%20crops