Is Bottled Water Really Healthy or Does It Raise Human Blood Pressure?

#4032

Category: EL
Division: Elementary
Science Type Project

Abstract can be found at the sefmd.org website

Introduction:

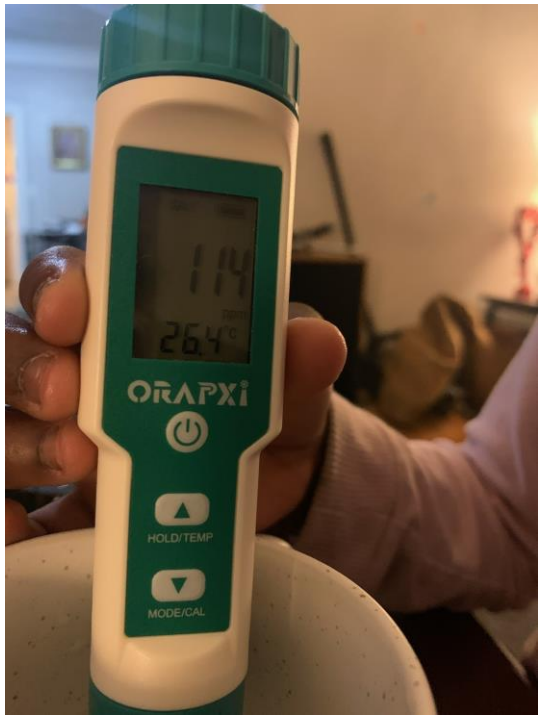
- Water is always in the conversations at our house. My sisters tested our tap water for health and compared it to bottled drinking water.
- It looked all the same to me last year, but all the samples got different grades on the WQI (Water Quality Index). Now it's under question again, but for very different reasons: salt content. In bottled water, not the ocean, and it's a problem for us humans.
- My aunt is super health conscious, she eats the proper foods, drinks only bottled water and still can't lower her blood pressure. Finally, her doctor told her to stop drinking bottled water and drink from the tap and she'd be fine. She did just that and she is fine! Who knew?
- I thought this was really strange. I could not taste any salt in her bottled water so the hypothesis that I chose to test is: that there will not be enough salt in bottled water to elevate blood pressure.

Methods: What is the experimental design?

- The purpose of this project is to perform Water Quality Index protocol tests on the various bottled water brands around here to determine if there are salt/sodium levels in the water and discover if any of these brands tested contain sodium levels high enough to elevate blood pressure.
- I chose several regional bottled water brands that were some my aunt would drink. These were: CORE, Fiji, Smart, Meijer distilled, Sam's Club brand, Meijer Electrolytes, Ice Mountain, Nestle Pure Life, Clover Valley, and Evian. I also tested our tap water since that's what the doctor said to drink.
- Samples from each regional bottled water brand will be tested using a multimeter that measures pH and conductivity to determine sodium levels. They will also be tested using the LaMott professional Water Quality Monitoring Testing kit.
- This data will be recorded in the logbook and the results will be analyzed to discover if salt is present in enough amounts to elevate or lower blood pressure in humans. The results will determine the validity or denial of the hypothesis.
- Several states have set a standard which will be used in this research to determine if sodium levels are above or below the standard for a safety factor. This standard is 20mg/L or 20 ppm. This means 20 milligrams per Liter or 20 parts per million.

Methods:
What is the experimental design?

This means 20 milligrams per Liter or 20 parts per million. The easiest way to understand this is to think of one million drops of water and 20 of those drops are salt. That is the most any water should have to be beneficial and not harmful to the humans who are drinking it. This standard only works for fresh water though. It is not the same for ocean water. The literature says that this standard depends on the human drinking it. Heart patients should not have water higher than this level.

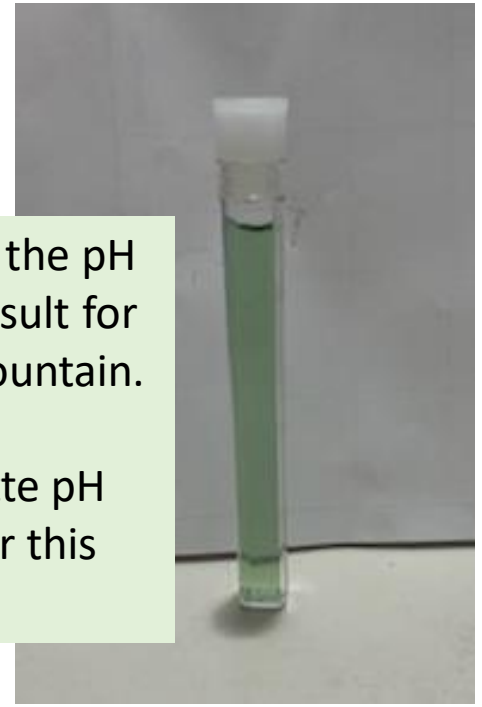


This is how most of the pH levels were obtained. I used a chem test because it was more fun than just using another probe, It seemed more like science. Watching the water change color is very cool!

Results:
What did the data show?

Brand	pH	Amount of Salt (ppm)
Core	8	129
Ice Mountain	8	180
Sam's Club	6	22
Meijer Distilled	8	0
Smart	7	23
Fiji	8	138
Pure Life	8	0
Evian	8	292
Meijer Electrolytes	7	24
Clover Valley	6	1
My tap water	7	114

As you can see, the salt levels were all over the place! It was expected that the tap water would be fairly low, but it was in the middle. This was completely unexpected.



This is the pH test result for Ice Mountain. I used LaMotte pH test for this one

I used a probe for this one. I still liked the chem test better.

Results:
What did the data show?

Brand	pH	Amount of Salt (ppm)
Core	8	129
Ice Mountain	8	180
Sam's Club	6	22
Meijer Distilled	8	0
Smart	7	23
Fiji	8	138
Pure Life	8	0
Evian	8	292
Meijer Electrolytes	7	24
Clover Valley	6	1
My tap water	7	114

Here is one area of concern. Look at the bottle of CORE water and locate how much sodium it is supposed to have. Now check the chart and see what the meter said it actually did have. Yes, it was calibrated first.

Discussion:
What does the Data Mean?

- Imagine this: most of the bottled water had less salt than my own tap water!
- CORE, Ice Mountain, Evian, and Fiji were higher. The pH levels were close. The 8s were more basic and the Clover Valley was acidic.
- Only Smart, Meijer with electrolytes, and my tap water were neutral, the way it is supposed to be.
- For the sake of this project, the brands were divided into three groups: Low salt, high salt, and average salt.
- This seems like a good match for people who need certain things in their diet.

Discussion: What does the Data Mean?

Low salt brands

Brand	pH	salt
Sam's Club	6	22
Meijer Distilled	8	0
Smart	7	23
Pure Life	8	0
Meijer Electrolytes	7	24
Clover Valley	6	1

In this group, my city tap water was the healthiest salt level for drinking. It also had the only neutral pH rating. The higher ones were more basic but it seems that Evian might keep you thirsty, with all that salt measured!

Heart patients need very little salt added, so perhaps these would be the best choice for them.

High salt brands

Brand	pH	salt
Core	8	129
Ice Mountain	8	180
Fiji	8	138
Evian	8	292
My tap water	7	114

Conclusion:

- The data did not really support or disprove my hypothesis. It did not prove what the doctor said to my aunt either.
- The tap water was higher than most of the brands of bottled water I tested. It was right in the middle of these numbers. What it does suggest, is that more work needs to be done.
- The limitations of this research are simple: the sample is too small and many more should be tested. More trials should be done, maybe with bottles from different manufacturing places, and over a longer period of time.
- There are many people who would be very interested in this type of project. Doctors, consumers like me, water product people, and anyone who wants healthy water would be interested.
- Next steps, if I want to continue this project would be to find different samples, and check those out I would also share my research with adults in my community and get feedback from them.

Conclusion:

- I would also like to visit a water place where tap water is restored for drinking and see what they say.
- I think the CORE people need a visit, too! My teacher thinks we should call them about what we found when we tested the water.
- In conclusion, I think that each person is made differently and some might need different types of bottled water and some might be fine with the tap water.
- As long as the other water quality tests were fine, people should be able to choose which one they wanted to drink.
- For some people, bottled water might have too much salt and it would elevate their blood pressure, but for others, it might not. Further study is necessary.

References / Works Cited:

- www.verywellhealth.com/high-blood-pressure-and-water-intake-5203030
- 15 Surprising Things That Raise Your Blood Pressure (webmd.com)
- How Dehydration Affects Blood Pressure (clevelandclinic.org)
- New study links bottled water with elevated blood pressure | Health | wfmz.com
- https://www.wfmz.com/health/new-study-links-bottled-water-with-elevated-blood-pressure/article_a9bc5dd7-5955-5afc-90e6-6b79c00cee2d.html