

BACKGROUND

There are different laws governing safety standards for tap water and mineral water in Japan. Tap water has stricter safety standards. The safety standards for tap water are set by the Water Supply Act(水道法). There are 51 items to check for the presence or absence of bacteria and the component's standard values. The water is delivered to homes as tap water only after all of the items have been checked. In contrast, the Food Sanitation Act (食品衛生法) is the safety standard for mineral water. The number of items that must be cleared by the Food Sanitation Law is 39 if there is a sterilization or disinfection process and 14 if there is no process, which is less than the Water Supply Act. That means that tap water is much safer than mineral water. In addition, consuming mineral water cause contamination of the environment as plastic water bottle garbage is a major source of pollution. On top of that, mineral water is way more expensive than tap water. Actually, the price of 1 bottle of mineral water is equivalent to about the price of 1000 or more bottles of tap water. Buying mineral water is a waste of money and resources.



PURPOSE

Japan has very strict standards for tap water. Yet, people say that it tastes different from a place to another. Is that really true or not? If so, what makes it different.

HYPOTHESIS

Tap water is different from one place to another because of the

MATERIALS

-Tap water samples from: Nagano, Toyama Aichi, Kyoto, Osaka, Gunma, and Ishikawa (prefectures)

-3in1 TDS Meter: EC / TEMP / TDS

-Tetra 6 in 1 Test Kit



EXPERIMENT

1- The tap water samples were left at room temperature for 30 minutes. This step was made in order to get reliable results under the same conditions.

2- TDS and Conductivity were measured using the TDS Meter.

3- Cl_2 , KH, pH, NO_2^- , NO_3^- were measured using the strip kit.

※The experiment was conducted 2 times to get accurate data.

※Data was recorded then analyzed.

※Water samples were tasted to confirm the taste difference



MEASUREMENTS

- TDS(ppm): A measurement of the total dissolved solids.

- Conductivity($\mu\text{S}/\text{cm}$): A measurement of the water's ability to conduct electricity.

- KH($^\circ\text{dH}$): A measurement of the sum of potassium and sodium.

- pH: A measurement of acidity.

- Cl_2 (mg/l): Chlorine is added to water to disinfect and kill germs.

- NO_2^- (mg/l): Nitrite comes from fertilizers through run-off water and mineral deposits.

- NO_3^- (mg/l): Nitrate is regulated in drinking water primarily because excess levels can cause diseases as blue baby syndrome.

RESULTS



DISCUSSION

Because the pH balance is the measurement of acidity, in water it does affect the taste. For instance, water with a pH less than 7 might damage the metal pipe that gives it a metallic or sour taste. If the pH is more than 7, it might cause an alkali taste to the water which causes bitterness to the coffee. pH has a role in the taste of water. The result shows that there was a difference in pH. That might be one reason to make the water taste different. For the TDS, higher TDS water has a heavier taste than the lower one. A very low TDS water has almost no taste and feels airy. There was no difference in the Cl_2 which means that was not a factor for the difference in the taste. For the conductivity, a higher conductivity value indicates that there are more chemicals (ions) dissolved in the water. Then, as the water's KH level increases, it is described as harder. For the KH, the higher concentration the KH is the saltier the water is. Nitrate and nitrite don't affect the taste or smell. However, a high level of nitrite and nitrate in drinking water can make people sick when ingesting. If a baby drinks it, it causes an illness called blue baby syndrome. From the results, we can confirm that tap water is safe in all the prefectures.

CONCLUSION

From this study, it is concluded that tap water from all the prefectures has different components. That can explain the difference in taste. It is impossible to say, "This is the most delicious water," because different people have different tastes. But personally, I think Ishikawa's and Toyama's tap water has a very fresh taste. I agree with people who said that.

REFERENCES

FOOD AND WATER WATCH
<https://www.foodandwaterwatch.org/about/live-healthy/tap-water-vs-bottled-water>
NRDC
<https://www.nrdc.org/stories/truth-about-tap-water-ph-page2.html#:~:text=The%20pH%20of%20pure%20water,than%207%20is%20considered%20basic.&text=Acidic%20water%20can%20cause%20premature,a%20metallic%20or%20sour%20taste.>
LIVESCIENCE
<https://www.livescience.com/54521-tap-water-tastes.html>
H2O DISTRIBUTORS
<https://www.h2odistributors.com/pages/contaminants/contaminant-chlorine.asp>
Center of Disease Control and Prevention
<https://www.cdc.gov/healthywater/drinking/private/wells/disease/nitrate.html#:~:text=Nitrate%20can%20occur%20naturally%20in,of%20human%20and%20animal%20waste.>
Krala Water
<https://www.krala.jp/special/knowhow/77/>
水のほなし
<https://www.water-kawaguchi.jp/object/mizunohanas9.pdf>
AFSC WATER
<https://www.freedrinkingwater.com/water-education/quality-water-ph-page2.html#:~:text=The%20pH%20of%20pure%20water,than%207%20is%20considered%20basic.&text=Acidic%20water%20can%20cause%20premature,a%20metallic%20or%20sour%20taste.>
WELL CARE
https://www.watersystemscouncil.org/download/wellcare_information_sheets/potential_groundwater_contaminant_information_sheets/9709284pH_Update_September_2007.pdf
Alberta
<https://myhealth.alberta.ca/alberta/pages/ls-there-Nitrate-in-My-Drinking-Water.aspx#:~:text=Nitrate%20and%20nitrite%20are%20molecules,or%20smell%20nitrate%20and%20nitrite.A>
おいしい水の掬いものろろん
<https://uunom.tokai.jp/column/detail/172>
AFSC WATER
https://www.freedrinkingwater.com/water_quality/quality/15-08-tds-affects-taste-of-water-page2.html#:~:text=Higher%20TDS%20water%20has%20a,Sodium%20content%20in%20the%20water.
Sask H2O
<http://www.saskh2o.ca/PDF-WaterCommittee/Nitrite.pdf>