

How to Make Salt Water More Drinkable?

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Introduction

The mention of saltwater, more commonly referred to as saline water, raises the general question every individual may have thought of at some stage: “Is salt water drinkable?” or “Why is salt water undrinkable?” Water encompasses about one-third of the earth’s total surface. Fresh drinking water forms about 1 percent of it, whereas two to three percent belongs to glaciers, while the remaining amount, mostly comprised of saline water, forms the oceans. The fact that saline water is undrinkable is related to the kidneys in the human body and the way they process water. The reason resides in the fact that drinking salt water will evidently result in dehydration and unfavorable circumstances arising due to it.

However, presently, there are methods through which saline water or salt water can be processed to a suitable drinkable state. Since the freshwater deposits are slowly decreasing and the level of water is dropping gradually, research into turning salt water into drinkable water has been seeking ways to make it available to the masses. However, since desalination requires large amounts of energy to convert for the process, and in order to carry out the needed task, facilities were required to do such a process. Plants are required for the desalination of salt water and demand a hefty amount of funding to carry out the process. As such, governments are less likely to adopt this method to resolve the crisis of diminishing freshwater reservoirs.

Discussion

The human body, consisting of about 50-60 percent water, exclusively relies on continuous intake. Most of the water acquired for human consumption comes directly from freshwater reservoirs. However, Earth’s surface forms up to one-third of water, which consists of about ninety-seven percent salt water, also known as saline water. Saltwater, being in an undrinkable state, poses a threat to humans. The process of desalination exhibits the process in which salt water, which is naturally heavier in density than fresh water, is slowly boiled till the water droplets gathered at the top of the flask can be removed/collected. These droplets are salt-free and fit for the use of either cooking or drinking and will pose no such threat to the human body.

Figure 1 Salts in Water

The above picture displays a detailed level of salt in seawater, exhibiting the relatively higher levels, compared to salt levels in fresh water. The human body will show signs of cell damage if any large

amount of fluid, with higher levels of salt. The cells will start showing signs of crushing inwards and eventually dying.

The objective of this is to make salt water more drinkable since the earth is 70 % water, and only 3% of the earth has fresh water. The other 97% is salt water, which is very unpleasant and unhealthy. So, to make salt water drinkable, there are many methods. The easiest and most widely used process to make saltwater drinkable is to boil the salt water. In this way, water evaporates at 100 degrees centigrade, and evaporated water vapors are collected and cooled down to get pure, drinkable water. Meanwhile, the salt doesn't evaporate at 100 degrees and remains in the flask. Hence, in this way, water and salt are separated from each other. The below pie diagram shows the amount of salt present in salt water, Note that in 1 kilogram of water, 34.4 gram of salt is present(*Can You Make Seawater Drinkable? | APEC Water*).

Figure 2(Salty Oceans)

The above pie chart gives a detailed explanation of salt water composition and its chemical constitution. This indicates that to live, we must be hydrated at all times and drink water. In other words, our lives depend on keeping our bodies hydrated in order to survive. Water essentially forms one of the most fundamental requirements for our body. Because of its quality as a good solvent, water is important for almost all life on Earth. The process of turning salt water can be performed by having the following material and following the below-mentioned steps in a precise manner,

Materials

- Water
- Salt
- A stove or a Bunsen burner
- A glass distilling flask
- A drinking glass
- A 4-quart saucepan
- A large leaf from a non-toxic plant (banana, fig, or taro are good choices).

Figure 3 (Rives and Riley)

Steps

1. Adding 70 grams of table salt in 2 liters of fresh water
2. Take some fresh water in a flask
3. Add some salt to the water and mix it gently to mix it well.
4. Taste the salt water, and be sure to spit it out. (Don't drink it)

5. Write down the saltiness of the water tasted and rate it in the table below.
6. Smell and record the scent of the salt water.
7. Write down the current look of the water in the table below.
8. Take another empty flask and connect the two flasks with the help of a condenser, as shown in Figure 3.
9. Also, place the thermometer in the flask that contains the saltwater
10. Now heat the flask which contains salt water and note the temperature on the thermometer
11. Heat the flask gradually until the temperature reaches up to 100-degree centigrade
12. At 100 degrees, the water in the flask starts to evaporate because the boiling point of water is 100 degrees centigrade.
13. The water vapors come out of the flask and move to the other emptied flask, and the condenser cools them down to convert them back to liquid state.
14. Salt will remain in the heating flask since salt doesn't evaporate at 100 degrees centigrade.
15. In this way, water and salt will separate from each other, and water can easily be collected from the vapors forming at the top.
16. Water that is collected in the other flask is 100% pure and drinkable
17. Based on the outcome, rate the distilled water.
18. Smell the water and record the current smell of it.
19. Observe the water state and note it down.

Results

Once the experiment is complete, a close analysis of the process will explain the process it takes to separate the salt from water. The water extracted from this process is pure and drinkable with the un-tasteable amount of salt present in it. This method is used primarily in the Middle East. Kuwait and Qatar rely on this technique to extract drinkable water for their use. Some countries use this way to extract salt from the water and use the salt for cooking food and other uses.

	Taste (saltiness)	Smell	Sight
saltwater	8	salty	Clearwater
freshwater	1	No smell	Clearwater
distilled salt water from flask	2	No smell	Clearwater

Once the readings have been properly noted in the table above, the significance between the two can be seen quite clearly. Distinguishing the difference between a sample of salt water and fresh water. Being different in their smell and taste, it will become evident towards why we can't drink saline

water. Seeing how salty saltwater is at eight indicates that freshwater is ideally more favorable for drinking. However, distilled salt water acquired after the process of salt separation is a favorable option after fresh water. However, the column labeled “sigh” signifies that both salt water and fresh water look alike and will be hard to identify between the two by simply observing them.

Conclusion

Conclusively, it can be stated that salt water, in a processed form, can be turned into a drinkable state. The desalination process requires a series of steps to be followed, as stated in the discussion above. Performing the steps carefully can ensure the possibility of minimizing the salt levels to a drinkable state. After boiling salt water, it evaporates at 100 degrees centigrade, and then evaporated water vapors are collected and cooled down to get pure and drinkable water. However, in the case of salt, it doesn’t exactly evaporate at 100 degrees and remains in the flask. In this way, collecting water while separating the salt is possible.

Presently, the desalination process is being carried out in California to cover the need for water for the local residents. However, desalination requires massive amounts of funding and, as such, can pose a financial threat to the government. The process of desalination in the above-mentioned steps signifies the process of performing the desalination process in a controlled environment. Boiling salt water to 100 degrees centigrade will cause water to start evaporating while leaving the salt behind. The vapor can then be collected, making it drinkable and safe for consumption. This process can also be conducted by boiling water at lower heat levels.

Works Cited

Can You Make Seawater Drinkable? | APEC Water.

https://www.freedrinkingwater.com/water_quality/quality1/1-make-seawater-drinkable.htm. Accessed 2 Jan. 2018.

Rives, Michael L., and James O. Riley. *Salt Water Distillation System*. Google Patents, 2010.

Salty Oceans. <https://www.wonderwhizkids.com/salty-oceans>. Accessed 2 Jan. 2018.

Sakai, Hideyuki, Morihiro Irie, and Akihiko Tanioka. “Salt water desalination equipment.” U.S. Patent No. 9,751,046. 5 Sep. 2017.

Kruse, Andrea, and Nicolaus Dahmen. “Water—A magic solvent for biomass conversion.” *The Journal of Supercritical Fluids* 96 (2015): 36-45.