

Filtered Water vs. Strained

When you're thirsty for a good drink of water, do you head for the nearest water faucet or drinking fountain? In almost all areas, water straight from the tap is safe to drink. It's the taste that might send you looking for something better. Many of us are willing to take (and pay for!) additional steps for making our water more acceptable to drink.

Today, we have several options for finding a pleasing taste. Consumers can buy bottled water, install under-the-sink reverse-osmosis systems, or use home-filtered water.

Besides improving the taste, how effective are home pitcher filter systems for "cleaning" tap water? Find out by performing some tests of your own.

Cleaning Water

Materials

Goggles and apron
Two small test tubes or vials with stoppers or tight-fitting caps

Classroom supplies

Two plastic Beral pipets
5 mL of 0.1 M Na_2CO_3 (sodium carbonate, 0.53 g per 50 mL of water.)
500 mL of tap water that has been filtered through a commercial pitcher-type filter
5 mL of 0.1 M AgNO_3 (silver nitrate, 0.85 g per 50 mL water.)
500 mL of tap water
5 mL of KSCN (potassium thiocyanate), 0.53 g per 50 mL of water.
1 mL Ivory liquid hand soap
1 multiple-well plate or spot plate

Procedure

In order to test the effectiveness of pitcher filter systems, we will test tap water and compare it to tap water that has been filtered. Make a table like the following for recording six interesting comparisons.

	Tap water	Filtered water
Appearance		
Smell		
Hardness		
Calcium*		
Iron*		
Chlorine*		

**These activities are intended to be completed in classrooms equipped with standard laboratory safety equipment. You'll need to wear goggles and aprons when performing these steps.*

Test for appearance

1. Place small, equal amounts of each kind of water in two clear, transparent vials. Label the vials.
2. Inspect each sample for clarity, color, and other physical features.
3. *Record your observations.* Save samples for the next step.

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Test for smell

4. Smell each sample. Describe the smell using one of the following: No Odor, Slight Odor, Moderate Odor, Strong Odor.
5. *Record your observations.* Save vials for the next step.

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Right From the Tap

Test for hardness

6. Add one drop of Ivory liquid hand soap (not liquid detergent) to each tube.
7. Stopper each tube and shake vigorously. The fewer suds produced, the harder the water.
8. *Record your observations.*

Test for iron (classroom only)

12. Place 20-drop samples of each kind of water into two separate wells of a well plate or other small container.
13. Add one to two drops of potassium thiocyanate (KSCN) test solution into each test well.
14. *Record your observations.* A positive test for iron is a dark amber-red color.

Test for chlorine (classroom only)

15. Place 20-drop samples of each kind of water into two separate wells of a well plate or other small container.
16. Add three drops of silver nitrate (AgNO_3) test solution into each test well.
17. *Record your observations.* A positive test for chlorine is a white precipitate.

Your conclusions?

In what ways are the filtered samples different from the unfiltered? How are the differences important to you? Are you persuaded to purchase and use a filtering pitcher by the results of these tests? Are there other factors you need to consider before deciding?

Test for calcium (classroom only)

9. Place 20-drop samples of each kind of water into two separate wells of a well plate or other small container.
10. Add three drops of sodium carbonate test solution into each test well.
11. *Record your observations.* A positive test for calcium is a white precipitate.

Extensions

- Try testing water that has been treated by other methods.
- Try to obtain water before and after it is treated by reverse-osmosis filter systems, household water softening systems, or commercial bottling.
- You can check for other substances using test papers or kits. There are many sources for water-testing kits. Home aquarium or pool-testing kits contain materials for several tests. You can also order special test strips or papers to analyze water samples. 🏠



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