

Water treatment for contaminated water | experiment



**ASSIGN
BUSTER**

Water Contamination

- Melissa Butler

Abstract

In the experiments that we have conducted, we used oil, vinegar, laundry soap, and soil to simulate polluted groundwater. Most of the contaminants are occurs naturally, aluminum, iron, and manganese. We then created a variety of filters to attempt to clean the ground water and make it drinkable. We also did experiments will prove that there is really no difference between the two. While doing my experiment we find out that bottle water and tap water have just about the same levels of contaminants as tap water.

Introduction

Some areas have water-containing contaminations from natural or non-natural sources. These impurities can cause health problems like rashes, diarrhea, and maybe even cancer. Contaminates can also damage equipment, plumbing, or make the water undrinkable, due to flavor, smell, appearance, or discoloration. Water that contain harmful contaminates need to be fixed immediately. “ According to the EPA, exposure to lead in drinking water can result in delayed physical or neurologic development in infants and children, and can cause high blood pressure, kidney problems, and cancer in adults. Moreover, a growing body of evidence suggests adverse health effects result even at blood levels below the 10 µg/dL “ level of concern” at which the Centers for Disease Control and Prevention (CDC) recommend intervention.” (Renner, 2009. A544). “ Before beginning any treatment plan, have water tested by an independent laboratory to determine the specific impurities and level of contamination. This will help <https://assignbuster.com/water-treatment-for-contaminated-water-experiment/>

you select the most effective and economical treatment method". (Ross, Parrott, Woods, 2009). The effects of exposure to some contaminants in our water supply are not known, but not all of them are health threats. The National Water Quality Inventory 1994 Report to Congress states " that 40% of flowing river and stream miles can be used for drinking water after conventional water treatment, and 37% of lake and reservoir acres meet the designated use criteria for drinking water" (EPA).

The reason why we conducted this experiment is to test the filtration to remove oil, vinegar, and laundry detergent has on soil before it reaches groundwater. These substances go to our local water supply, and into our soil. While the things that we have tested are relatively are no very dangerous, but we have to think of the thing that can get through and cause harm.

Materials and Methods

Experiment 1: Effects of Groundwater Contamination

In this experiment, we tested ground water for impurities. The materials that were used was eight 250mL beakers, three wooden stir sticks, 10mL of vegetable oil, 10mL of vinegar, 100mL graduated cylinder, 10mL of liquid laundry detergent, 100mL beaker, 240mL of soil, cheesecloth, funnel and water. With a marker, the eight 250mL beakers were labeled number one through eight. Putting five through eight to the side, fill with beakers one through four with 100mL of water using the 100mL graduated cylinder to help measure the water. In beaker number two 10mL of vegetable oil was put in and with a wooded stir stick was stirred thoroughly. In beaker number three 10mL of vinegar was added and with a wooded stir stick was stirred

<https://assignbuster.com/water-treatment-for-contaminated-water-experiment/>

thoroughly. In beaker number four 10mL of liquid laundry detergent was added and with a wooden stir stick was stirred thoroughly. At this time, I wrote down my observations of beakers one through four in Table 1. I cut the cheesecloth into four pieces and folded them so that it was four layers thick. I placed one piece of cheesecloth into the funnel, measured 60mL of soil using the 100mL to help measure the soil, and poured that into the funnel. Taking beaker number one, I poured the contents into the funnel and let that filter into beaker number five. Using the same technique as above I repeated the same thing to beakers number two through four and poured them into beakers number six through eight. Once this was done I observed beakers five through eight and wrote down my observations into the Table.

Experiment 2: Water Treatment

We add 100 mL of soil to the 250 mL beaker, and fill to the 200 mL mark with water.

Then we move the soil solution back and forth between the two 250 mL beakers a total of 15 times. We will use 10 mL of the contaminated water into a clean 100 mL beaker, and compare it to the “ treated” water at the end of the filtration process. We add 10 grams of alum to the 250 mL beaker containing the “ contaminated” water and slowly stir the mixture with a wooden stir stick for 1-2 minutes and let the solution sit for 15 minutes. Then rinse out the empty 250 mL beaker and place the funnel into the beaker. Use four layers of cheesecloth that can line the funnel. Put cheesecloth inside funnel. Pour 40 mL of sand into the cheesecloth-lined funnel, 20 mL activated charcoal, and 40 mL gravel. Use a 100 mL beaker to measure these amounts. To set the filter, slowly pour clean tap water through the filter until

<https://assignbuster.com/water-treatment-for-contaminated-water-experiment/>

the funnel is full. Remove the clean water from the beaker and repeat four more times. Return the funnel to the top of the beaker and let sit for 5 minutes before emptying the beaker and continuing the experiment. Without mixing up the current sediment in the “contaminated” water jar, pour about 3/4 of the “contaminated” water into the funnel. Let it filter through the funnel into the beaker for 5 minutes. Note the smell of the filtered water, comparing it to the 10 mL sample taken from the mixture in Step 3. Remove the filter and add a few drops of bleach solution to the filtered water within the beaker. Stir the water and bleach combination slowly for about 1 minute.

Experiment 3: Drinking Water Quality

Label three 250 mL beakers Tap Water, and bottle water (Fiji and Dasani).

Pour 100 mL of the each type of water into the corresponding beakers.

Ammonia, Chloride, Four in one, Phosphate, and Iron Test Strip test

Find the ammonia test strips. Begin by placing the test strip into the tap water sample and briskly moving the strip up and down in the water for 30 seconds, making sure that the pads on the test strip are always immersed.

Remove the test strip from the water and shake off the extra water. Hold the test strip level, with the pad side up, for 30 seconds. 6. Read the results by turning the test strip so the pads are facing away from you. Compare the color of the small pad to the color chart at the end of the lab. Record your results in the table Repeat the procedure for both bottled water.

Results

Experiment 1: Effects of Groundwater Contamination

Table 1: Water Observations (Smell, Color, Etc.)

Beaker | Observations |

Beaker 1: Water is clear, no smell

Beaker 2: No smell, color is almost clear. Water did not mix well, created small bubbles. Oil separated from the water.

Beaker 3: No color and water is clear. It also has a smell of vinegar.

Beaker 4: Has a smell of perfume and the water turned green.

Beaker 5: Water turned brown in color some soil residue at the bottom. Has a smell of wet dirt.

Beaker 6: The water change to a light brown color. The soil has filtered out some of the oil, because some of the oil was left behind. Some residue of soil was at the bottom. Smells like wet dirt.

Beaker 7: Water still smell like vinegar and smell like dirt, brown in color and residue of soil is at the bottom.

Beaker 8: Water has a perfume smell, the water is brown and light green mixed. Made light suds and bubbles, with the residue of dirt at the bottom.

Discussion

Why do we buy bottle water when tap water is the same thing? People buy more bottler water now than ever before. Do we really think that it is safer to drink? The answer is no. Doing this experiment has proven that there is really not much of a difference between the two. While doing my experiment

if find out that bottle water and tap water have just about the same levels of iron, ammonia, chloride, phosphate, and etc.

I found that everyday chemicals that we use can contaminant our water supply and could have potential to be harmful if the water is not treated for human consumption. According to the results, only beaker with the vinegar came out to where you will be able to potential drink the water.

Conclusions

What I found to be the most interesting thing in this experiment is that vinegar helped purify the water so that it could be drinkable. All the contaminants that were used were found to make the filtered water dirty and did not help in purifying the water. I concluded that we need to find a way to get the contaminants out of the water , even bottle water so that our children do not have to deal with the health problems that could be associated with drinking contaminated water.

References:

Basic Information about E. coli O157: H7 in Drinking Water. (n. d.). Retrieved May 8, 2015, from <http://water.epa.gov/drink/contaminants/basicinformation/ecoli.cfm>

<http://water.epa.gov/drink/contaminants/basicinformation/ecoli.cfm>

Renner, R. (2009). Out of Plumb, Environmental Health Perspectives.

117(12), A542-A547. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2799485/>

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2799485/>

Ross, B., Parrott, K., & Woods, J. (2009, May 1) Household Water Quality: Water Quality Problems - Causes and Treatments. Retrieved May 7, 2015. <http://pubs.ext.vt.edu/356/356-482/356-482.html>

Skip Menu. (n. d.). Retrieved May 9, 2015, from <http://pubs.ext.vt.edu/356/356-482/356-482.html>

Water contamination. (n. d.). Retrieved May 8, 2015, from <http://extoxnet.orst.edu/faqs/safedrink/watercon.htm>