

Student Worksheet

- What is nanotechnology?
- What classifies something as a silver nanoparticle?
- How can silver nanoparticles be used to clean water?

Individual research notes:

Making Silver Nanoparticles with Plant Extract

Materials:

- 400 ml beaker with 200 ml of distilled water
- plant sample of your choice
- empty 400 mL beaker
- razor blade
- mortar and pestle
- hot plate
- funnel and 2 coffee filters
- 15 ml conical tube
- 10 ml of 0.1 M AgNO_3 (silver nitrate) from teacher when ready to use
- gloves
- goggles
- scale

To make plant extract:

1. Clean your plant leaves with distilled water to remove dirt and debris.
2. Mash leaves with the mortar and pestle or cut up your plant into small pieces. Your goal is to have about 10 grams of plant material. Place your plant on the scale to determine the mass of our plant material after it has been cut up. Mass of your plant: _____ g
3. Bring your beaker of 200 ml of distilled water to a boil and add your plant material. Boil for 10 minutes or until the color of the water changes.
4. Place your funnel in an empty 400 ml beaker and put the filter paper inside the funnel.

Name: _____ Date: _____ Class: _____

5. Wait for your beaker with the plant material to cool. Once cool, pour the contents into your funnel with the filter. Be careful to not puncture the filter.

To make silver nanoparticles:

1. Obtain 10ml of silver nitrate and add it to your 15 ml conical tube.
2. Add your plant extract, 1 ml at a time, to the silver nitrate until you reach a total volume of 5 ml of plant extract.
3. Incubate the silver nanoparticles overnight.

Observations:

Retest:

Now that you have had time to analyze your plant's ability to produce silver nanoparticles and have listened to other's results, it is time to retest! You may use your same plant and change part of the procedure (such as how much plant is used, how it is cut up, change the part of the plant, amount of time to boil); you may pick a different plant, or you may use a combination of plants. Develop a plan with your group and write it down below.

Retest Design:

Observations:

Name: _____ Date: _____ Class: _____

Reflection:

How did the results of your retest differ from your original test?

Did your retest improve the ability to make silver nanoparticles? (Was there less color change?)

Name: _____ Date: _____ Class: _____

Write a letter to the foreman of your local water plant.

Explain to the foreman why silver nanoparticles should be used on the water filters and columns. Describe the problem with the current method with making silver nanoparticles and why doing it the green way with plants is better. Describe the process of how to get silver nanoparticles from plants. Include your suggestion for what plant should be used and justify your recommendation using data.