

How Hard Is Your Water? Worksheet

Data Table and Calculations

Beaker Number	1	2	3
Drops of 0.010 M EDTA			
Drops of water per 1.0 mL in micropipet			
Volume of EDTA used (mL)			
Volume of EDTA used (L)			
Moles of EDTA used			
Mass of calcium in 5.0 mL sample (g)			
Mass of calcium in 1.0 mL (g)			
Parts Per Million of calcium (ppm)			

Average value of calcium in Beakers 1, 2, and 3 (in ppm) _____

Questions *(Show all work on a separate sheet of paper.)*

- Convert the number of drops of EDTA used in each titration to milliliters of EDTA used.
- Convert the milliliters of EDTA used in each titration to liters of EDTA used. Record these values in the data table.
- Calculate the number of moles of EDTA used in each titration, using the volumes calculated in the previous question and the molar concentration of the EDTA, 0.010 M. Record these values in the data table.
- Given that one mole of EDTA reacts with one mole of calcium, calculate the number of grams of calcium that were present in each of the 5.0 mL samples. (*Hint:* Use the molar mass of calcium.) Record these values in the data table.
- Taking the density of water to be 1.0 g/mL (or 1000g/L), a calcium ion concentration of 1.0 g/L would correspond to 1000-ppm. Convert the results from question #4 from grams of calcium per 5.0 mL sample to grams of calcium in 1.00 mL. Then multiply this value by 1,000,000 to get parts per million of calcium. Record each individual sample value and the average value of parts per million calcium in the data table.
- Identify two major sources of experimental error in this analysis and suggest ways in which the procedure could be modified to minimize those errors.