



**FOOD SCIENCE  
LABORATORY EVENT  
Wisconsin Science Olympiad  
Division C**

**Calcium Determination  
Concentrations**

**Materials:**

50 mL buret  
250 mL beaker  
50 mL graduated cylinder  
5 mL pipet  
EDTA solution (disodium dihydrogen ethylenediaminetetraacetate)  
Calmagite indicator solid  
Buffer Solution of pH 10  
0.010M Calcium Chloride Standard Solution  
liquid food sample

**Methods:**

**STUDENTS:**

1. Rinse buret with EDTA solution and then fill buret with EDTA solution
2. Standardize EDTA
  - a. Measure 50 mL of 0.01 M calcium chloride solution and put into a 250 mL beaker
  - b. Pipet 1.0 mL buffer solution to beaker
  - c. Add calmagite indicator (should turn pink)
  - d. Record initial volume of EDTA and titrate solution until it turns light blue and again record volume
  - e. Subtract volume measurements to find volume EDTA used to titrate and calculate the molar concentration of EDTA

$$(mL_{EDTA}) (M_{EDTA}) = (mL_{Ca\ Soln}) (M_{Ca\ Soln})$$

3. Titration

- a. Measure 50 mL of sample and put into 250 mL beaker
- b. Pipet 1.0 mL buffer solution to beaker
- c. Add 2-3 drops calmagite indicator (should turn pink)
- d. Record initial volume of EDTA and titrate solution until it turns light blue and again record volume
- e. Subtract volume measurements to find volume EDTA used to titrate and calculate the molar concentration of calcium in sample

$$(mL_{EDTA}) (M_{EDTA}) = (mL_{Ca\ Soln}) (M_{Ca\ Soln})$$

4. What is the molar concentration of the EDTA solution?
5. What is the molar concentration of calcium in the sample?
6. If the density of the liquid food sample is 1.003 mg/L what is the Molality of calcium in the sample?
7. How much of this liquid food sample would an individual need to consume in order to get the recommended 1300 mg/day? (Please give answer in mL)