**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ How much calcium carbonate is in that antacid tablet?**

# Introduction: One of the main ingredients in antacid tablets (such as Rolaids, Tums etc.) is calcium carbonate, which helps to neutralize stomach acid in the following general reaction;

Acid + Carbonate 🡪 Salt + Water + Carbon Dioxide

There are also a number of other ingredients in these tablets such as binders, which hold the tablet together, but that you can assume contain no calcium or carbonate ions. In the lab, we can mimic the action of antacids in the stomach by reacting the calcium carbonate with hydrochloric acid (often helped by the addition of a few mL of distilled water and some very gentle heating). The binding materials will not dissolve (they are insoluble in acid). Aqueous calcium ions can be precipitated by the use of a solution of carbonate ions.

# Materials: Filter papers and funnels, various pieces of normal laboratory glassware (beakers etc.), stirring rods, mortar and pestle, drying oven, hot plate, Antacid tablets, 3 M HCl, distilled water, 1 M Na2CO3.

# Pre-Lab Questions:

1. Write the chemical equation for the reaction between solid calcium carbonate and aqueous hydrochloric acid.
2. Write the chemical equation for the reaction between aqueous calcium chloride and aqueous sodium carbonate.
3. The label claims there is 750mg of CaCO3 inside each tablet as the “active ingredient.”
4. Based on this value, how many milliliters of 3M HCl are needed to react with the Calcium carbonate in the tablet?
5. How many milliliters of 1M Na2CO3 are needed to react with the calcium ions?
6. What is the theoretical mass of calcium ions in the tablet that weighs 1.90g?
7. In experiments where precipitates are formed and collected via filtration from aqueous solutions, the failure to completely dry the precipitate always has the same consequence. What is that consequence?
8. The concentration of barium ions in any solution can also be determined via gravimetric analysis. An impure sample of barium nitrate with a mass of 1.234 g, is completely dissolved in water and the resulting solution is reacted with an excess of aqueous sodium sulfate. A precipitate forms, and after filtering and drying, it was found to have a mass of 0.848 g.
9. Write the chemical equation for the reaction of aqueous sulfate ions and aqueous barium ions.
10. Why would you add excess sodium sulfate?
11. Calculate the percent of barium nitrate in the original 1.234g sample.

Plan your procedure:

# Data:

# Post Lab Questions:

1. Calculate the mass of Ca+2 ions in your tablet.
2. Calculate the percent of CaCO3 in your tablet.
3. Calculate the percent yield
4. Discuss the possible sources of error in your experiment. BE SPECIFIC.