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Percentage of Acetic Acid in Vinegar and Some Commercial Antacids

**Objective:**

The purpose of this lab was to determine the percentage of acetic acid in vinegar, as well as the percent of active ingredient in antacid tablets using volumetric analysis.

**Procedure:**

A buret was rinsed with distilled water first, then re-rinsed with a small amount (2ml) of NaOH. The buret was then set up on a buret stand and clamped in place. The buret was then filled to slightly above the 0.00mL mark with NaOH, and then was opened until the bottom of the meniscus was on the 0.00mL mark. Afterwards, 10 mL of vinegar was added to a clean Erlenmeyer flask, along with 15 ml of distilled water and 2 drops of phenolphthalein indicator. The flask was then placed under the buret, and the stopcock was opened. The flask was swirled continuously as the NaOH was dripping into it, until the solution in the flask turned uniformly light purple. The volume of NaOH was recorded at that point. The experiment also involved measurement using antacid tablets. A single antacid tablet was broken into two halves. Each half was placed into an erlenmeyer flask containing 50 ml of HCl solution, and then heated on a hot plate until dissolved. The solution was set aside to cool, and then was titrated as in the initial experiment.

**Specialized Chemical Technique:**

The process of titration was studied and practiced during this lab. Proper use of a hot plate was studied and practiced. Standard safety procedures were followed.

**Final Result:**

During the first trial, the initial reading on the buret was 0.00 mL of NaOH. After titration, the volume and the reading on the buret was 17.31 mL. During the second trial, the initial reading was the final reading for the first trial (17.31ml). The final reading for the second trial was 33.75 mL, which leaves a 16.44 mL volume displacement. The first half of the antacid tablet required 33.50mL of NaOH to titrate, and the second half required 40.00mL. 11.076mmol of NaOH solution was required to neutralize the excess HCl of the first tablet, and 12.48mmol of the solution was required for the second tablet.

**Conclusion:**

After calculations, the first trial yielded a 5.13% by mass of acetic acid in the vinegar solution, while a the second trial yielded a 4.89% by mass of acetic acid. The average percent by mass was 5.01%. The mass of the active ingredient in the first tablet was calculated to be 554 mg, and 624 mg in the second tablet.

**Attachments:**

* Vinegar Analysis Data
* Experiment: Some Commercial Antacids