

# AP Chemistry Review Questions

Vinegar is a dilute aqueous solution of acetic acid produced by the fermentation of apple juice (cider vinegar), grapes (wine vinegar), or barley malt (malt vinegar). Federal regulations require that vinegar contain at least 4% acetic acid by mass. If the amount of acetic acid is less than 4%, the acidity level may not be high enough to prevent the growth of bacteria in pickled or canned foods. The amount of acetic acid in vinegar can be determined by microscale titration with a standard solution of sodium hydroxide.

- Write the balanced chemical equation for the reaction of acetic acid with sodium hydroxide.

In the microscale titration, the exact number of drops of sodium hydroxide of known molarity (0.50 M) needed to react completely with a measured number of drops of vinegar was counted. Assume the amount of vinegar was 15 drops for each trial.

Brand of Vinegar	White Cider Vinegar
Titration Trial	Number of Drops of NaOH Added
1	24 drops
2	27 drops
3	24 drops
4	26 drops
5	26 drops

- Calculate the average molarity of acetic acid in the vinegar using the data provided.

- Calculate the average percent acetic acid in the vinegar using the following equation.

$$\% \text{ acetic acid} = \frac{\text{g (acetic acid)}}{\text{mL (vinegar)}} \times 100\%$$