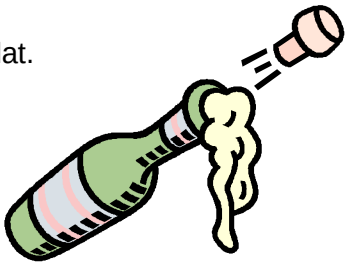
KEEPING CHAMPAGNE BUBBLY

Student Worksheet

MYTH

A teaspoon left in the top of an open champagne bottle will keep it from going flat.



OBJECTIVE

Investigate variables that effect the concentration of carbon dioxide in champagne.

WHAT YOU NEED

- 4 bottles of champagne (200mL bottles can be used)
- Teaspoon
- Refrigerator access
- pH meter
- burette and retort stand
- 200mL 0.1M sodium hydroxide
- bromothymol blue indicator (preferred) or phenolphthalein indicator
- 2 x 20mL pipette and pipette filler
- 4 x 200mL conical flask
- 4 x 50mL graduated cylinder
- Wash bottle
- small funnel

WHAT TO DO

1. Cool 4 bottles of champagne in the refrigerator.
2. Label the bottles: “open”, “open and closed”, “closed” and “teaspoon”.
3. Using the small funnel, fill the burette with 0.1M sodium hydroxide.
4. Open the top of the “open” bottle. Pour 30mL of champagne into a graduated cylinder. Leave the lid off the bottle.
5. Use the pH meter to measure the pH of the solution.
6. Use a pipette to deliver 20.0mL of champagne into a conical flask.
7. Use another pipette to add 20.0mL of 0.1M sodium hydroxide to the same conical flask.
8. Add three drops of indicator and titrate using standardized 0.1M sodium hydroxide.
9. Open the “teaspoon” bottle. Pour 30mL of champagne into a graduated cylinder. Leave the lid off the bottle and hang a teaspoon in the neck of the bottle.
10. Repeat steps 5-8.
11. Open the “open and closed” bottle. Pour 30mL of champagne into a graduated cylinder. Replace the lid of the bottle tightly.
12. Repeat steps 5-8.
13. Place all 4 bottles back in the fridge for at least 48 hours.
14. Repeat steps 3-6 and 8-12.
15. Open the “closed” bottle. Pour 30mL of champagne into a graduated cylinder. Replace the lid of the bottle tightly.
16. Repeat steps 5-7.
17. Use your results to calculate the amount of carbonic acid in each of the samples.
18. Convert the pH measurements to concentrations of carbonic acid.

QUESTIONS

1. Compare the carbonic acid concentrations from the titration results with the pH meter results.
2. In what parts of the method are errors likely to occur? Discuss how these might affect your results.
3. What other variables might you test to further investigate this myth?

RESOURCES USED TO DEVELOP THIS ACTIVITY

1. Ash, M. et. al. (1996). *Q chemistry*. Brisbane: Jacaranda.
2. Riede, C. (2008). Champagne: The Science of Bubbles. Retrieved 20 November, 2009, from http://french-wine.suite101.com/article.cfm/champagne_the_science_of_bubbles