Using a Hydrometer to Establish a Sucrose Concentration Curve to Determine the Sugar Content of a Commercial Beverage

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Author Note

The data included in this laboratory is the result of the careful work of three laboratory teams in the General Chemistry class at Mason (or Milford) and was not acquired on my own. Thank you to Mrs. Morales for putting together the graph of our data.

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If you were writing an introduction to this paper, this is the section where you would provide the definition of density and specific gravity, because you were using density as measured by the hydrometer to establish your concentration curve.

 You might also mention what concentration curves are: they are curves developed from the data collected from standardized solutions; standardized solutions are those very carefully measure – with absolute precision. From the curve you establish with these standardized solutions you can then extrapolate data for the unknown concentration of a beverage. Using the hydrometer, you measure the density of the unknown, then plot it on the concentration curve (looking at the scale on the y-axis), and draw a line down to the x-axis to ascertain the unknown’s percent composition (w/ V).

 Within the introduction, you also summarize your experimental protocol and results. Cite the textbook whenever necessary (Wilbraham, Staley, Matta, & Waterman, 2002), this is called an “in text” citation, because you are crediting the authors of the textbook within the body of the text of your lab report.

**Methods**

Here you break this section down into two: a materials section wherein you list all of the chemicals with their concentrations, together with any other supplies, tools, glassware, measuring devices, etc., used.

**Materials**

 Mention sucrose solutions

 Mention glassware here

 Mention tools used

 Everything you needed to perform this experiment needs to be listed as a “material”

**Procedure**

Since this procedure was broken down into two protocols, write a sentence here describing the protocols in general that you used. Save the step-by-step details for subsections below.

 **Establishing a concentration curve.** To a 250 mL graduated cylinder, we added about 230 mL of water so as to calibrate our hydrometers, and recorded the density in Table 1. We then…

 **Determining the concentration of the commercial beverage.** After completing the graphing of the concentration curve, we poured about 230 mL of degassed Mountain Dew into the cylinder and …

 **Analysis of the data.** After recording the density of the commercial beverage, we then extrapolated its concentration, using the concentration curve we established with the standardized sucrose solutions… we recorded our percent discrepancy in Table 2.

**Results**

All measurements and the calculations derived from them, as included in the table below.

|  |
| --- |
| Table 1*Hydrometer Reading*  |
|  | (Density [g/ cm3]) |
| Sugar % Solution | 1st Reading | 2nd Reading | 3rd Reading | Average |
| 0% |  |  |  |  |
| 3% |  |  |  |  |
| 6% |  |  |  |  |
| 9% |  |  |  |  |
| 12% |  |  |  |  |
| 15% |  |  |  |  |
| Coca Cola |  |  |  |  |
| Mountain Dew |  |  |  |  |

You are free to write a commentary on your results at this point, or save it for after Table 2. If you delete spaces here, make sure you do not merge the tables together.

|  |
| --- |
| Table 2*Error Analysis of Beverage Concentration* |
| Experimental value for Coca Cola concentration (% w/V) | Key value |
| Theoretical value for Coca Cola concentration (% w/ V) | In |
| Percent discrepancy: $\frac{|experimental-theoretical|}{theoretical}x 100$ | These |
| Experimental value for Mountain Dew concentration (% w/V) | Boxes |
| Theoretical value for Coca Cola concentration (% w/ V) | Here |
| Percent discrepancy: $\frac{|experimental-theoretical|}{theoretical}x 100$ | See? |

**Statement Analyzing the Percent Composition of Your Beverages (Change This Heading, Write the Heading in Your Own Words)**

#  Blah, blah, blah, take note of Table 1 and see how wonderful my data is.

# **Percent Error**

 Using the below as an example, type out how you calculated percent error.

$$\% error\_{cola}=\frac{\left|11.5-10.8\right|}{11.5} x 100=6.09\%$$

 Make a commentary on percent error.

# **Discussion**

You don’t need this section this time… aren’t you glad? Here you would actually discuss your data, and offer ideas as to how the protocol could have been improved, were your results satisfactory, etc.

# **References**

Providence Extension Program/ General Chemistry course. (2019). Using a Hydrometer to Determine the Concentration of Sugar in a Commercial Soft Drink. Loveland, OH: Self- publish.

Wilbraham, A.C., Staley, D.D., Matta, M.S., & Waterman, E.L. (2002). Chemistry. Upper Saddle River, NJ: Prentice Hall, Inc.