Sugar Density Lab

Chemistry Name

OBJECTIVE: To graph the densities of multiple sugar solutions.

INTRODUCTION

Obesity is increasingly a problem in the U.S., and many have pointed to the consumption of high calorie drinks as a cause. Most of these beverages use high fructose corn syrup as a sugar source, though some use natural sugars including glucose, sucrose, and naturally occurring fructose from fruits.

In this lab, we will use the density formula  to find the densities of several sugar/water solutions. Since sugar mixes well with water, it does not add as much volume as goes in. That is, a cup of sugar plus a cup of water produces less than two cups of solution. Thus, a higher sugar percentage translates to a higher density solution.

We will first find the masses and volumes of the solutions, then calculate density for each. After this step, we will graph the densities as a function of percent sugar.

MATERIALS

● balance ● 25ml graduated cylinder ● sugar solutions

PROCEDURE

1. Measure the mass of the graduated cylinder.
2. Obtain about 20ml of solution. Record the exact volume, to the nearest tenths place.
3. Measure the mass of the sugar in the cylinder.
4. Repeat for all solutions.

DATA

Mass of graduated cylinder

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| % sugar | Volume | Mass with cylinder | Mass sugar | Density |
| 0 |  |  |  |  |
| 10 |  |  |  |  |
| 20 |  |  |  |  |
| 30 |  |  |  |  |
| 40 |  |  |  |  |
| 50 |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sample | Volume | Mass with cylinder | Mass sugar | Density |
| Unknown1 |  |  |  |  |
| Unknown2 |  |  |  |  |
|  |  |  |  |  |

GRAPH OF DENSITY



POST LAB QUESTIONS

1. What was the purpose of graphing the density of the solutions of known concentration?

2. Use the equation below to calculate the mass of sugar in a regular-size, 360- mL (12-oz) can of the beverage you tested with the highest sugar concentration: sugar (g) = volume of beverage (mL) x % sugar (reduced to decimal form)

3. According to the labels, a 360-mL can of soda typically contains around 40g of sugar. Estimate the sugar concentration and density of a typical soda.

4. Howmany teaspoons of sugar (1 teaspoon sugar = 5 g) are you “eating” when you drink a 360- mL can of

a. typical soda?

b. the beverage you tested with the highest % sugar?

5. If you drank one extra 360-mL can of your favorite soda every day, how many pounds would you gain in one year? Assume the following:

• A can of your favorite soda contains 40 g of sugar, the typical amount.

• Each gram of sugar is converted into 4 food Calories.

• All the calories are converted into body fat at a rate of 3500 Calories = 1pound of fat.