Yeast Respiration Contest Lab

Your goal: Design a method to inflate a balloon using the carbon dioxide given off by respiring yeast. The person with the biggest balloon (as measured by circumference around the middle) on day 2 wins the contest.

Materials Needed: yeast, balances, graduated cylinders, balloons, string or flexible measuring tape (to measure circumference), test tubes, sugar, warm water bath(s), ice bath, test tube racks, rubber bands, other assorted items as desired…

Lab Report:

1. Do some research. What are yeast and how can you get them to respire?
2. Write out your procedure (step by step) below, in complete, clear sentences.

|  |  |
| --- | --- |
| 1. Draw your apparatus below: | 1. Explain how your apparatus works below: |
|  |  |

1. Fill in the provided table:

|  |  |  |
| --- | --- | --- |
| **Variable** | **Measurement (include units)** | **Rationale (Explain Your Reasoning)** |
| Amount of Yeast |  |  |
| Amount of Sugar |  |  |
| Amount of Water |  |  |
| Temperature |  |  |

Group Data Table: Comparison of Carbon Dioxide Production for Different Groups as Measured by Balloon Circumference.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Group # | Balloon Circumference (cm) | Yeast Amount (g) | Sugar Amount (g) | Water Amount (ml) | Temperature  (oC) |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 |  |  |  |  |  |
| 5 |  |  |  |  |  |
| 6 |  |  |  |  |  |
| 7 |  |  |  |  |  |
| 8 |  |  |  |  |  |
| 9 |  |  |  |  |  |
| 10 |  |  |  |  |  |

Bar Graph: Include a bar graph comparing the results of different groups below (Be sure to fill in any missing graph components!):

Title:

Group Number

Analysis Questions

1. Which group won? Analyze your data table. Which variables seem to have been most significant to this group’s victory? Why?
2. Which gas was being produced by the yeast to fill up the balloons? Write the equation for respiration below and circle this gas.
3. Explain the role of sugar in this lab.
4. Why is it necessary to give the yeast water?
5. How did temperature influence respiration? Why might this be? Hint: remember that the reactions of respiration are catalyzed by enzymes.
6. How would excessive amounts of sugar (a solute) affect yeast in terms of osmosis? Do you see any evidence that suggests a group may have added too much sugar? Explain.
7. Did adding a higher quantity of yeast always cause a higher production of carbon dioxide through respiration? Suggest reasons for your observation (consider concepts relating to population ecology, limiting factors etc.).
8. Referencing our class data, explain how you would modify your design and why.