Exercise 6 - Biology 105

Respiration, Week 2

Purpose:

Today each group will explore more about the processes of fermentation and respiration in yeast, a common decomposer. Any study should lead to new questions. You learned last week some techniques for studying fermentation. Today you will ask questions that might be answered with those techniques.

Again, the purpose here is not to just learn some facts. The laboratory portion of the course is also a place to learn some of the skills scientists use, such as:

1. Asking scientific questions
2. Problem-solving
3. Data analysis
4. Evaluating the quality of an experiment and how much confidence you have in its results

A. Propose a question about yeast and respiration that can be investigated using the respirometers you learned to use last week.

Your questions may examine one of these parameters, or others.

- table salt (its effect in bread-making),
- other chemicals (e.g. vinegar or alcohol – two possible products of wine making)
- pH
- amount of sugar
- kind of food
- kind of yeast
- this list is not meant to be exhaustive, so don't let it limit your imagination or questions.

Get your question approved by your instructor before going on.

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B. Plan and carry out a controlled experiment that attempts to answer your question. Use the format, reviewed below, that you have used in the previous weeks' experiments. Turn back to the previous two labs for any descriptions or examples as necessary. Your instructor may have you hand in some or all of the following.

I. Introduction, in which you let the reader know the problem you will consider in your investigation. Include:

your question
justification for question – (what makes it interesting or important?)
alternative hypotheses

II. Methods, in which you tell what you actually did in enough detail that somebody else could repeat the experiment. The results obtained using scientific methods must be repeatable by other investigators for scientists to have confidence in them.

Your 'Methods' section should include descriptions of or reference to:

- independent variable
- dependent variable
- constant variables
- experimental and control treatments
- predictions
- assumptions
- replicates
- protocol -- Go through what you're going to do step by step, thinking about possible problems and how to solve them. Think about how you carry out the experiment beforehand so you will be able to collect your data efficiently. Consult any notes you made from last week's lab.
  (For time of incubation, you don't have to plan in advance.
  Check every 10 minutes and see if you have enough happening to see a difference. Then stop.)

III. Results, which include the data and descriptions of data, but not interpretations. This section should include:

- Data and/or descriptive statistics (e.g. means, standard error)
- Graphs or tables that depict the data
- A description of noteworthy data, but not interpretations

IV. Conclusions and Discussion should include:

- Interpretations of data,
  - Does the data help you answer your original question?
  - Does the data support or refute your hypothesis?
- Possible problems in your experiment methods
- Possible problems in your conclusions
- Direction of future research

C. Some suggestions on lab technique

1. Don't assume anything is clean.
2. Don't put anything back into a stock bottle that you have removed. For example, if you've taken dextrose from a jar, and found that you've taken too much, don't put the excess back in.
3. Powders won't dissolve well in small test tubes. Make up solutions in beakers.
4. Yeast and starch don't dissolve; always stir well to keep them in suspension as you fill tubes.