

Habib University

iSciM

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ENER 104L RENEWABLE ENERGY

LABORATORY REPORT 1

Global Warming

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1 Objectives

- Understand effect of various factors in our atmosphere.
- Understand that excess CO₂ intensifies the greenhouse effect
- Why is greenhouse effect important and what does it have to do with climate change?
- Does greenhouse gases really make the temperature rise?

2 Abstract

This report explores the greenhouse effect's impact on Earth's atmosphere, taking into consideration of natural and human factors that fuel global warming. A strong emphasis is created to reduce global warming pollution, this is done with the aid of practical experiments to us understand these complex processes. Part A focuses on dissecting the causes of global warming, with emphasis on the role of greenhouse gases. A hands-on experiment, based on a climate change by modeling our earth, is conducted to measure temperature fluctuations, so that we can foster a tangible understanding of this critical environmental issue. Part B delves into photosynthesis and respiration in plants, this experiments aids to quantify carbon dioxide and oxygen exchange. This helped us understand how life itself interacts with the environment, and enabled us to grasp a better concept of Earth's ecosystems and the difficulties it faces. Overall, this report aims to provide a comprehensive understanding of the greenhouse effect and its impact on our planet.

3 Result and Analysis

3.1 Part I: The Greenhouse Effect

3.1.1 Temperature Graphs

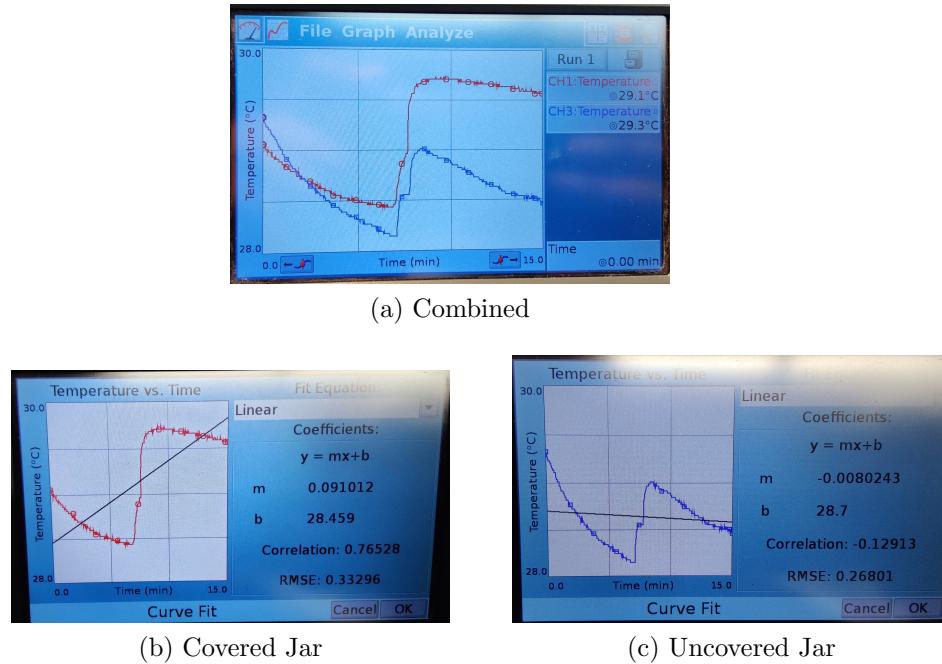


Figure 1: Temperature Graphs

3.1.2 Temperature Table

Table 1: Temperature Table

| | Covered Jar (°C) | Uncovered Jar (°C) |
|---------|------------------|--------------------|
| min | 28.4 | 28.1 |
| max | 29.7 | 29.3 |
| mean | 29.1 | 28.6 |
| st. dev | 0.51668 | 0.26998 |

3.2 Part II: Photosynthesis and Respiration

3.2.1 Covered Jar

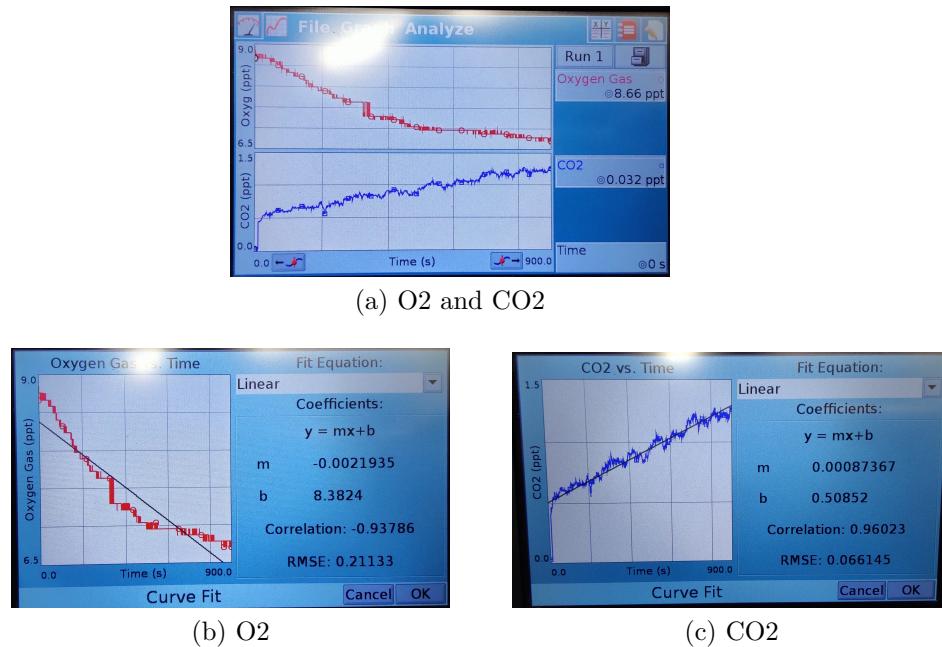


Figure 2: Covered Jar

O₂ and CO₂ Graphs

Table 2: O₂ and CO₂ Table

| | O ₂ (ppt) | CO ₂ (ppt) |
|---------|----------------------|-----------------------|
| min | 6.7 | 0.032 |
| max | 8.84 | 1.277 |
| mean | 7.4 | 0.902 |
| st. dev | 0.60866 | 0.23678 |

CO₂ and O₂ Table

3.2.2 Uncovered Jar

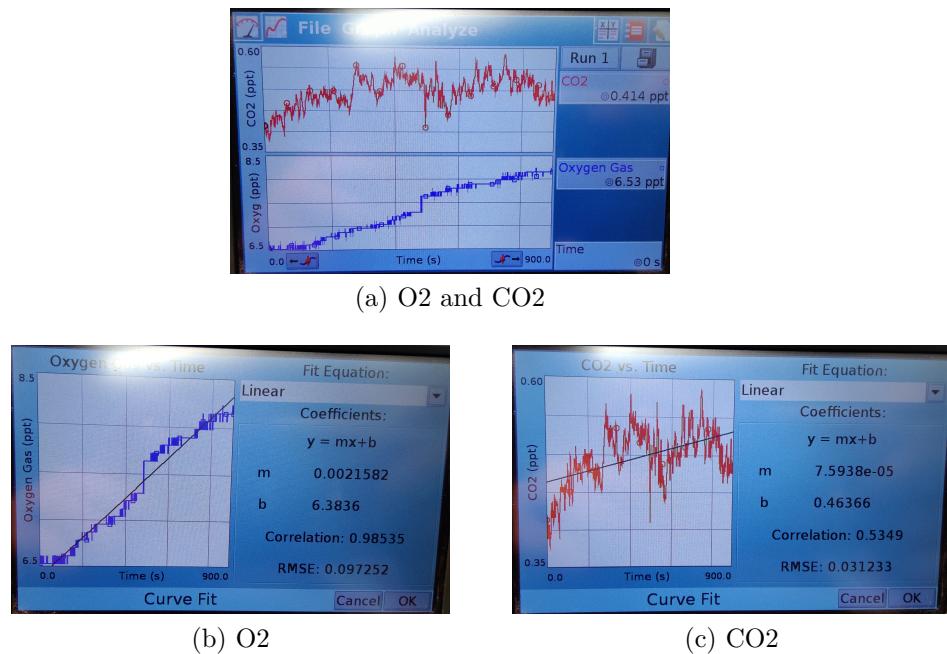


Figure 3: Uncovered Jar

O₂ and CO₂ Graphs

Table 3: O₂ and CO₂ Table

| | O ₂ (ppt) | CO ₂ (ppt) |
|----------------|----------------------|-----------------------|
| min | 6.53 | 0.376 |
| max | 8.24 | 0.586 |
| mean | 7.35 | 0.498 |
| st. dev | 0.56999 | 0.036946 |

CO₂ and O₂ Table

4 Conclusion

For part A of the experiment, we observed that the covered jar had a higher temperature than the uncovered jar. This is because the covered jar was insulated, and the heat was trapped inside. This is similar to the greenhouse effect, where the heat is trapped inside the earth's atmosphere.

For part B of the experiment, we observed that the covered jar had a higher concentration of CO₂ and a lower concentration of O₂ than the uncovered jar. This is because the plant inside the uncovered jar was photosynthesizing, and releasing O₂ and absorbing CO₂. The plant inside the covered jar was respiring, and releasing CO₂ and absorbing O₂.

5 Questions To Ponder

5.1 Part A:

1. Explain with reasons which beaker covered or uncovered has the greatest temperature change?
2. Which beaker has the greatest rate of temperature change and why?
3. What is slope and the rate of reaction?
4. Why might the greenhouse effect be a problem for our earth?
5. Did the model greenhouse warm faster or slower than the control? What do you think caused the difference?
6. Describe one advantage of using a greenhouse.

5.2 Part B:

1. Were either of the rate values for CO₂ a positive number? If so, what is the biological significance of this?
2. Were either of the rate values for O₂ a positive number? If so, what is the biological significance of this?
3. Do you have evidence that photosynthesis occurred in leaves? Explain.
4. Do you have evidence that respiration occurred in leaves? Explain.