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 intensif ies 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?

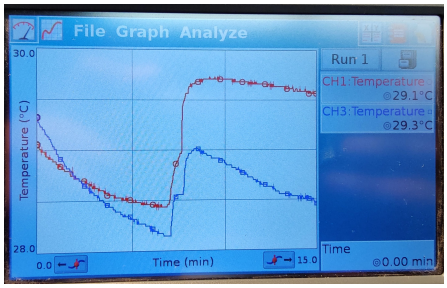
2 Abstract

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 golbal 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 planent.

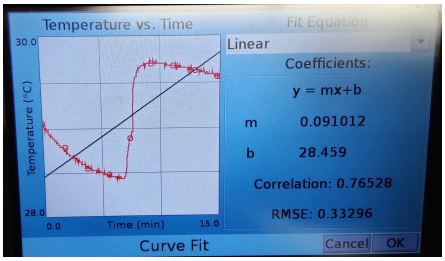
3 Result and Analysis

3.1 Part I: The Greenhouse Effect

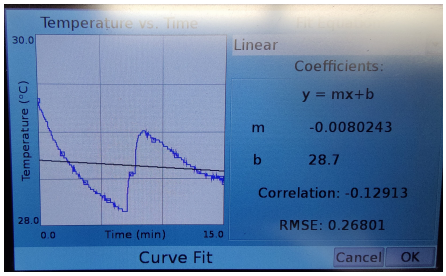
3.1.1 Temperature Graphs



(a) Combined



(b) Covered Jar



(c) Uncovered Jar

Figure 1: Temperature Graphs

We can observe from the graphs that the covered jar had a higher temperature than the uncovered jar. The irregularities in the graph are due to the temperature sensor being moved around in the jar.

3.1.2 Temperature Table

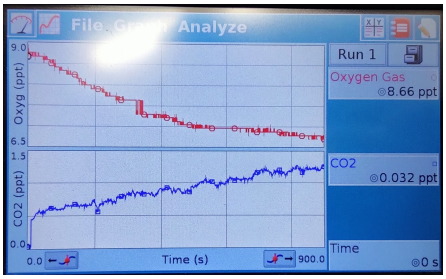
Table 1: Temperature Table

	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

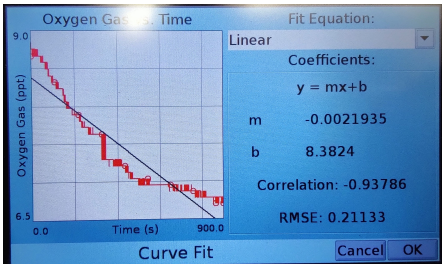
We can observe from the table that the covered jar had a higher min, max, mean and standard deviation than the uncovered jar.

3.2 Part II: Photosynthesis and Respiration

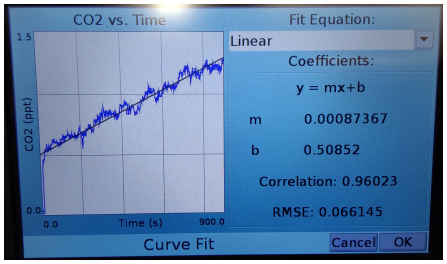
3.2.1 Covered Jar



(a) O2 and CO2



(b) O2



(c) CO2

Figure 2: Covered Jar

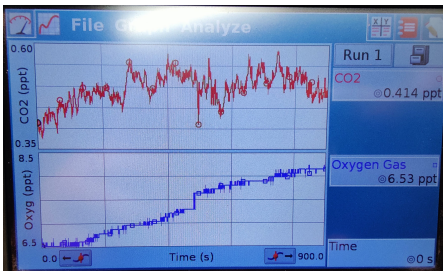
O2 and CO2 Graphs We can observe from the graphs that the oxygen concentration in the covered jar decreased, and the carbon dioxide concentration increased.

Table 2: O2 and CO2 Table

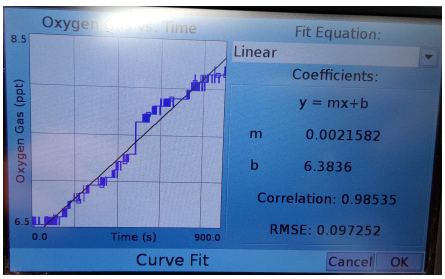
	O2 (ppt)	**CO2 (ppt)**
min	6.7	0.032
max	8.84	1.277
mean	7.4	0.902
st. dev	0.60866	0.23678

CO2 and O2 Table

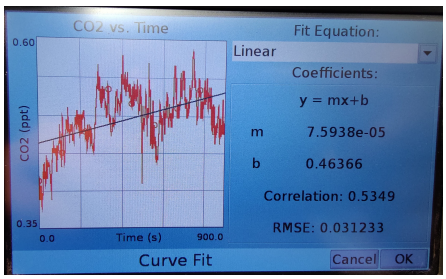
3.2.2 Uncovered Jar



(a) O2 and CO2



(b) O2



(c) CO2

Figure 3: Uncovered Jar

O2 and CO2 Graphs We can observe from the graphs that the oxygen concentration in the uncovered jar increased, and the carbon dioxide concentration decreased.

Table 3: O2 and CO2 Table

	O2 (ppt)	**CO2 (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.