

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

3.1.2 Temperature Table

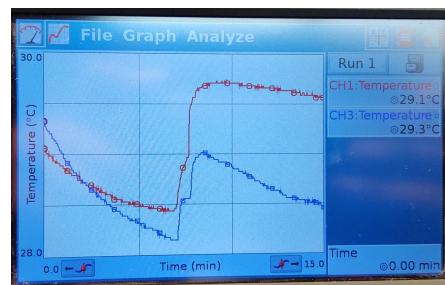
Table 1: Temperature Table

	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

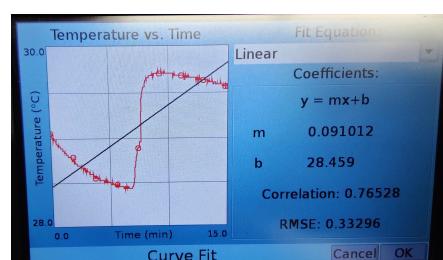
3.2 Part II: Photosynthesis and Respiration

3.2.1 Covered Jar

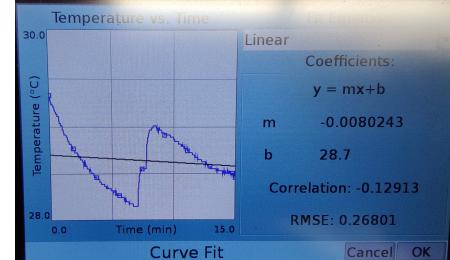
CO₂ and O₂ Graphs



(a) Combined

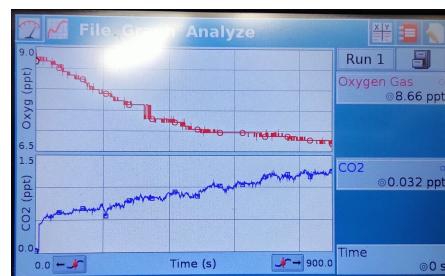


(b) Covered Jar

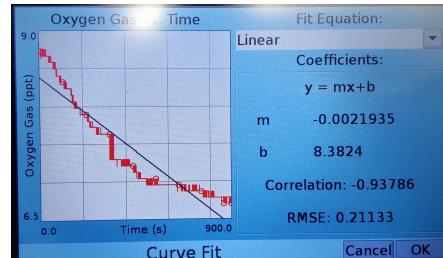


(c) Uncovered Jar

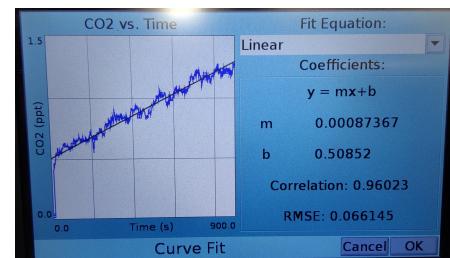
Figure 1: Temperature Graphs



(a) CO2 and O2



(b) O2



(c) CO2

Figure 2: Covered Jar

4 Conclusion

abc

5 Questions To Ponder

5.1 Part A:

1. Explain with reasons which beaker covered or uncovered has the greatest temperature change?

The covered beaker has the greatest temperature change because it replicates the greenhouse effect, similar to the greenhouse gases present in our atmosphere, so the greenhouse effect is more prominent in the covered beaker. Due to which it a greater temperature change compared to the uncovered beaker, this is because the plastic wrap traps heat within the beaker leading to a rise in temperature significantly higher than the uncovered beaker.

2. Which beaker has the greatest rate of temperature change and why?

The uncovered beaker has the greatest rate of temperature change, as it is not covered by plastic wrap, i.e. less insulation heat transfers more easily between inside of beaker and surrounding environment. This leads to heat escaping and thus a greater rate of temperature change.

3. What is slope and the rate of reaction?

In a graph the slope is of the curve at any given point and this slope represents the rate of reaction. The steeper the slope, faster the reaction. Similarly the rate of reaction is a measure of how fast a reaction occurs. The rate of reaction is the change in concentration of products or reactants.

4. Why might the greenhouse effect be a problem for our earth?

The greenhouse might be a problem for our earth because it traps heat within our atmosphere and this is intensified by human activities such as burning fossil fuels, leading to a rise in temperature, and hence numerous problems arise. For example, global warming, leads to melting of ice caps, which further leads to rise in sea level, and due to all of this many coastal areas will be submerged, and many more to come.

5. Did the model greenhouse warm faster or slower than the control? What do you think caused the difference? The model greenhouse warmed faster than the control, this is because the plastic wrap has insulating properties and traps heat within the beaker. This is similar to the greenhouse gases present in our atmosphere, which trap heat.

6. Describe one advantage of using a greenhouse. There are many advantages of using a greenhouse, one of them is that it allows us to grow plants in a controlled environment, or in colder seasons where it is not possible to grow plants. This is because the greenhouse traps heat within it, which extends the growing season for plants.

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.

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Table 2: Experimental result for First order low pass filter

Chybovost %					temp2
10	10	10	10	10	10

Table 3: Experimental result for Second order low pass filter

$V_{in}(mV)$	f	$V_2(mV)$	(I.L)dB	Phase (ϕ)
5760	100 Hz	1190	-13.70	-5°
5730	200 Hz	1160	-13.87	-11°
5630	500 Hz	1070	-14.42	-21°
5320	1 kHz	849	-15.94	-38°
4930	2 kHz	560	-18.89	-65°
4830	5 kHz	265.1	-25.21	-74°
4780	10 kHz	123.86	-31.73	-77°
4700	20 kHz	32.55	-43.19	-79°
4700	50 kHz	7.7	-55.7	-83°
4700	100 kHz	2.29	-63.26	-85°