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Low Cost, Accurate System for the Monitoring of Rotating Algal **Biofilm** Reactors with **Raspberry Pi**

Introduction

- **Bioprocessing** is a rapidly growing field with a need for careful monitoring
- **Current Monitoring** can be high cost or not easily scalable
- **Single Board Computers** are low cost, accurate, and easily adapted to multiple sizes and types of sensors

Methods

We analyzed the temperatures over several days in Rotating Algal Biofilm Reactors (RABRs) with the raspberry pi setups we made (Figure 1)

1. Code was designed that takes measurements at specified time increments and uploads them to a spreadsheet
2. Raspberry Pi computers were wired with sensors and set up to work over WIFI (Figure 2)
3. Measurements were recorded and will be analyzed to determine the relation between growth patterns and temperature. (Graph 1)

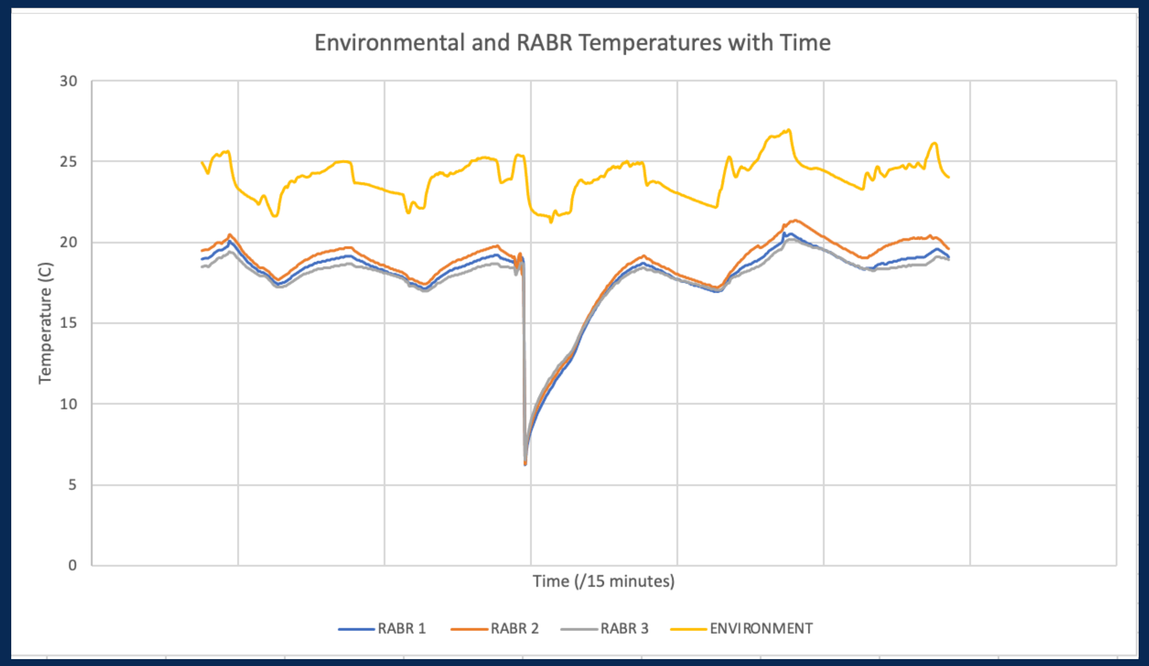
Expected Results

We expect to see patterns of growth vary with temperature. With the future installment of more sensors, we also expect to see growth vary with Photosynthetically Active Radiation (PAR).

Conclusions

- Raspberry Pi has proven an effective and cost-efficient way to monitor RABRs
- Due to its small size and easily remodeled structures, Raspberry Pi is ideal solution for bioprocessing research scalability

Graph 1 – Temperature recorded every 15 minutes



Raspberry Pi was used to. Measure and record temperatures every 15 minutes over the course of multiple days. This data will be used to evaluate how temperature effects algal growth.

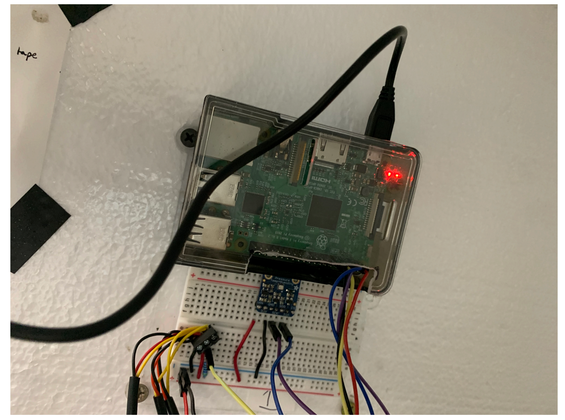


Figure 1: Raspberry Pi Set-Up

Figure 2: RABRs with Sensors

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