# Lab 11 Response: Investigating Food Waste Composting

**Hypothesis**:

**Table 11.1: Initial measurements of experimental groups used for the composting investigation. Containers are \_\_\_\_ x \_\_\_\_\_ x \_\_\_\_\_ cm; stored at [temperature in °C] in [no, low, medium, or high amount of light].**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Container ID** | **Food Waste Type** | **Aeration Level\*** | **Initial Mass of Food Items (g)** | **Initial pH of Contents** | **Initial Temperature (°C) of Contents** |
| A |  | High |  |  |  |
| B |  | Low |  |  |  |
| C |  | High |  |  |  |
| D |  | High |  |  |  |
| E (control) | None (soil only) | High |  |  |  |

\* Keep this high for all containers except one with a duplicate food type. Alternatively, substitute Surface Area for Aeration Level. Food that was chopped will have a high surface area.

**Insert image(s) of your initial set-up**, showing the various containers with their contents:

**Insert image(s) of the weekly or last observation(s)**, showing the various containers with their contents:

**Table 11.2A: Weekly measurements of container A ( \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ food).**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Week** | **Temp (°C)** | **pH** | **Moisture (Low/Med/High)** | **Mass of Remaining Food (g)** | **Qualitative Observations (e.g., color, odor, fungal growth)** |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 |  |  |  |  |  |
| 5 |  |  |  |  |  |
| 6 |  |  |  |  |  |

**Table 11.2B: Weekly measurements of container B ( \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ food).**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Week** | **Temp (°C)** | **pH** | **Moisture (Low/Med/High)** | **Mass of Remaining Food (g)** | **Qualitative Observations (e.g., color, odor, fungal growth)** |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 |  |  |  |  |  |
| 5 |  |  |  |  |  |
| 6 |  |  |  |  |  |

**Table 11.2C: Weekly measurements of container C ( \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ food).**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Week** | **Temp (°C)** | **pH** | **Moisture (Low/Med/High)** | **Mass of Remaining Food (g)** | **Qualitative Observations (e.g., color, odor, fungal growth)** |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 |  |  |  |  |  |
| 5 |  |  |  |  |  |
| 6 |  |  |  |  |  |

**Table 11.2D: Weekly measurements of container D ( \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ food).**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Week** | **Temp (°C)** | **pH** | **Moisture (Low/Med/High)** | **Mass of Remaining Food (g)** | **Qualitative Observations (e.g., color, odor, fungal growth)** |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 |  |  |  |  |  |
| 5 |  |  |  |  |  |
| 6 |  |  |  |  |  |

**Table 11.2E: Weekly measurements of container E (soil, no food).**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week** | **Temp (°C)** | **pH** | **Moisture (Low/Med/High)** | **Qualitative Observations (e.g., color, odor, fungal growth)** |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |

## Data Analysis

Calculate the % mass lost of the food for each container:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Container** | **Food Type** | **Initial Mass (g)** | **Final Mass (g)** | **% Mass Lost** |
| A |  |  |  |  |
| B |  |  |  |  |
| C |  |  |  |  |
| D |  |  |  |  |

% mass lost = ((Initial mass – Final mass) / Initial mass) × 100

## Graph

Generate and insert a line graph of the % mass lost of the food in the composting containers over time. Your graph will thus have 4 lines. Be sure to show the data points for each line, distinguish each line by a different color, provide a legend, and label the graph axes.

*Optional: Also include graph(s) of pH or temperature changes of the composting material over time.*

## Questions

1. Which food type decomposed fastest? (Briefly describe your determination of “decomposed.”) Why?
2. How did differences in aeration or the surface area of food scraps affect the composting process? What qualitative or quantitative observations support your response?
3. What signs of microbial activity did you observe? Relate to your qualitative (such as slimy film, fuzz, thread-like structures) and quantitative observations.
4. How did pH over time compare with various composting stages?
5. Did your results support your hypothesis? Explain.
6. Describe how your results compared to those of others in your class.
7. Synthesize and apply to nutrient cycling: Answer the following and relate to your investigation; cite any sources used:
8. How does composting food waste close nutrient loops in agricultural or urban systems?
9. What practices could optimize nutrient retention during the composting process?
10. Reflection for action: Based on your findings, how would you modify the technique to compost your home food scraps? Investigate other methods you might use; cite your sources. What would be the best option for your household? How might you use your compost? (Also see below.)
11. Optional: Visit the Fuel Garden at the College of DuPage. Observe the composting process and meet with the garden manager. Explain their composting process and how it compared to your investigation. Also describe how their compost is used and if they accept compost donations.