



Chemical Changes in Soil Throughout the Process of Decomposition in Order to Determine PMI Estimation

Miranda Kolatski, Benjamin Southwell
Department of Chemistry, Lake Superior State University

Introduction

- Time of death estimations are broad and can prove to be inaccurate
- Factors that influence decomposition are environmental temperature, body size, humidity and current chemical levels of the body and soil
- ME's rely on taking the temperature of the body and performing a calculation
- This assumes the body's pre-mortem temperature does not consider the change in temperature over course of exposure
- Project Goal: Evaluate chemical changes in soil as cadavers decompose for a deeper analysis of PMI estimations

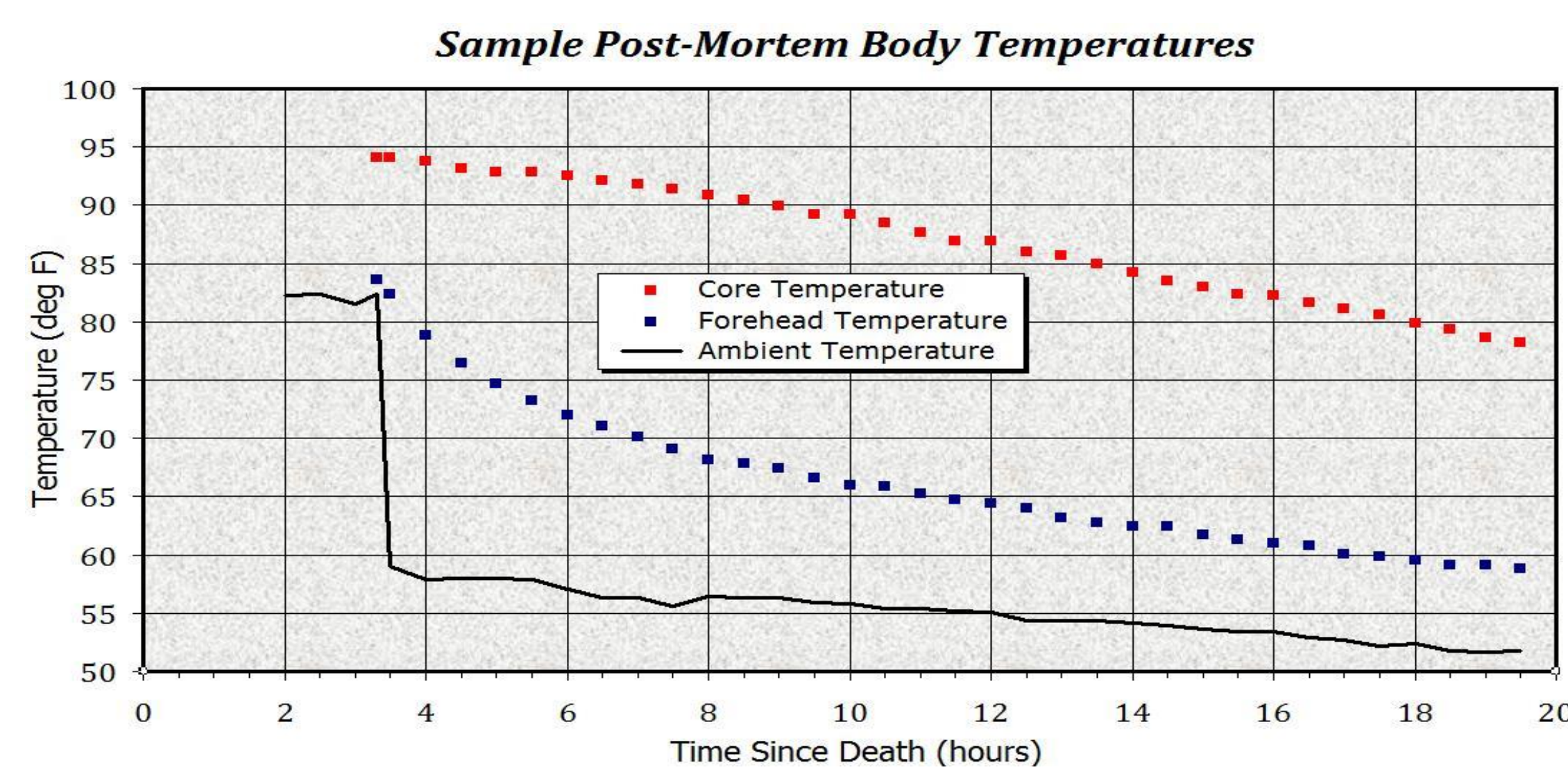
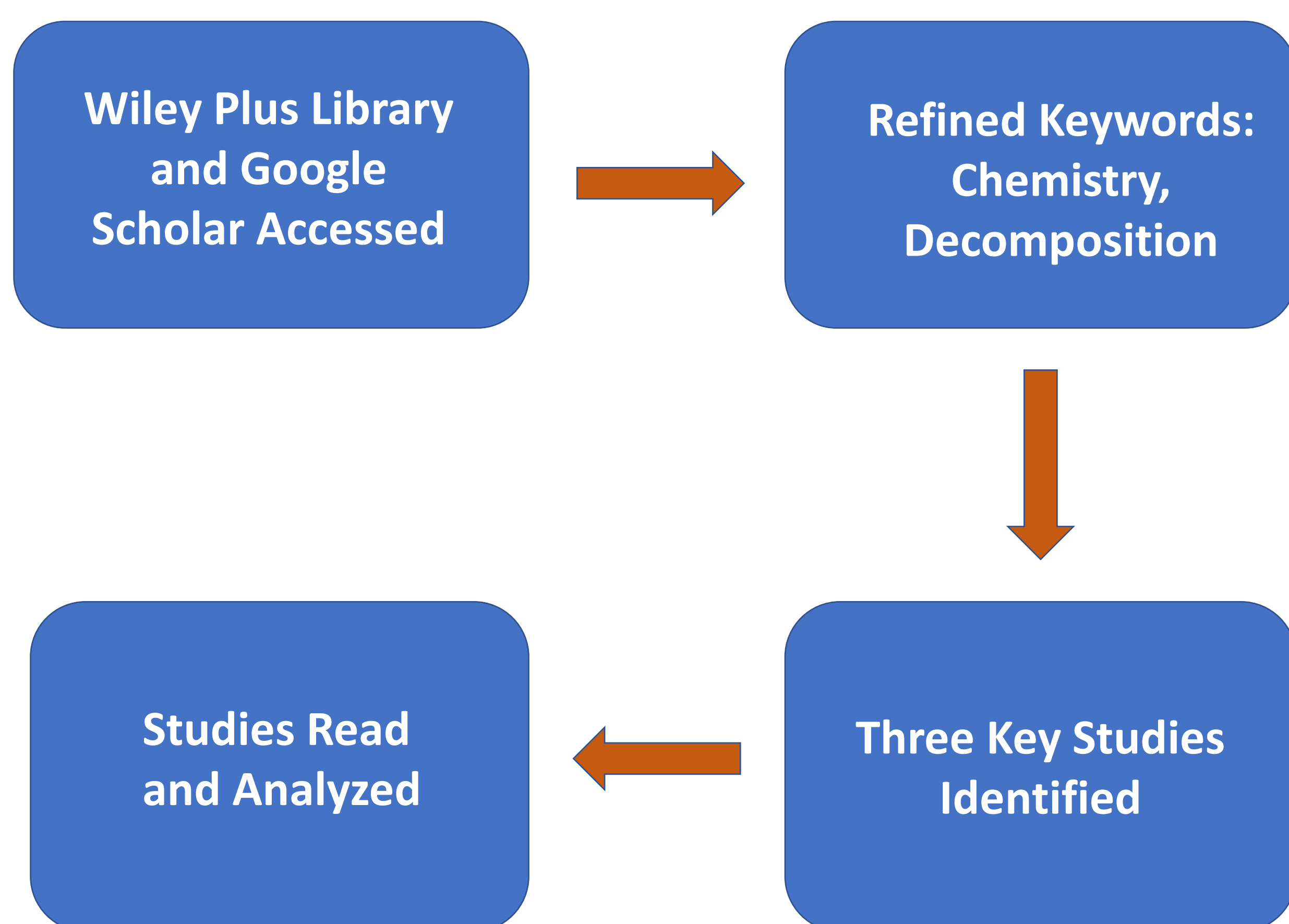


Figure 1: Example of temperature fluctuation over the course of decomposition

Methods



Results

- All studies demonstrated an increase in both the nutrient levels of the soil as well as the acidity levels
- University of Nebraska-Lincoln focused on ecological settings pre and post decomposition
 - Found that nutrient levels tend to increase throughout the process of decomposition
 - Higher moisture means that depletion is lessened
 - Soil becomes more acidic due to the release of fumes from organs breaking down
- Ankara University and Hacettepe University evaluated the chemistry of soil as it changes throughout the process of decomposition
 - Found an increase in chemical levels in the grave samples and decrease in the control.
- Ayers at Texas State University compared differences in various soil and water environments
 - Pig cadavers placed in various environments and checked periodically
 - Found that there is an increase in acidity levels and nutrient levels in soil
 - Water yielded less nutrients than the soil environments



Figure 2: Set up of Ayers Study.

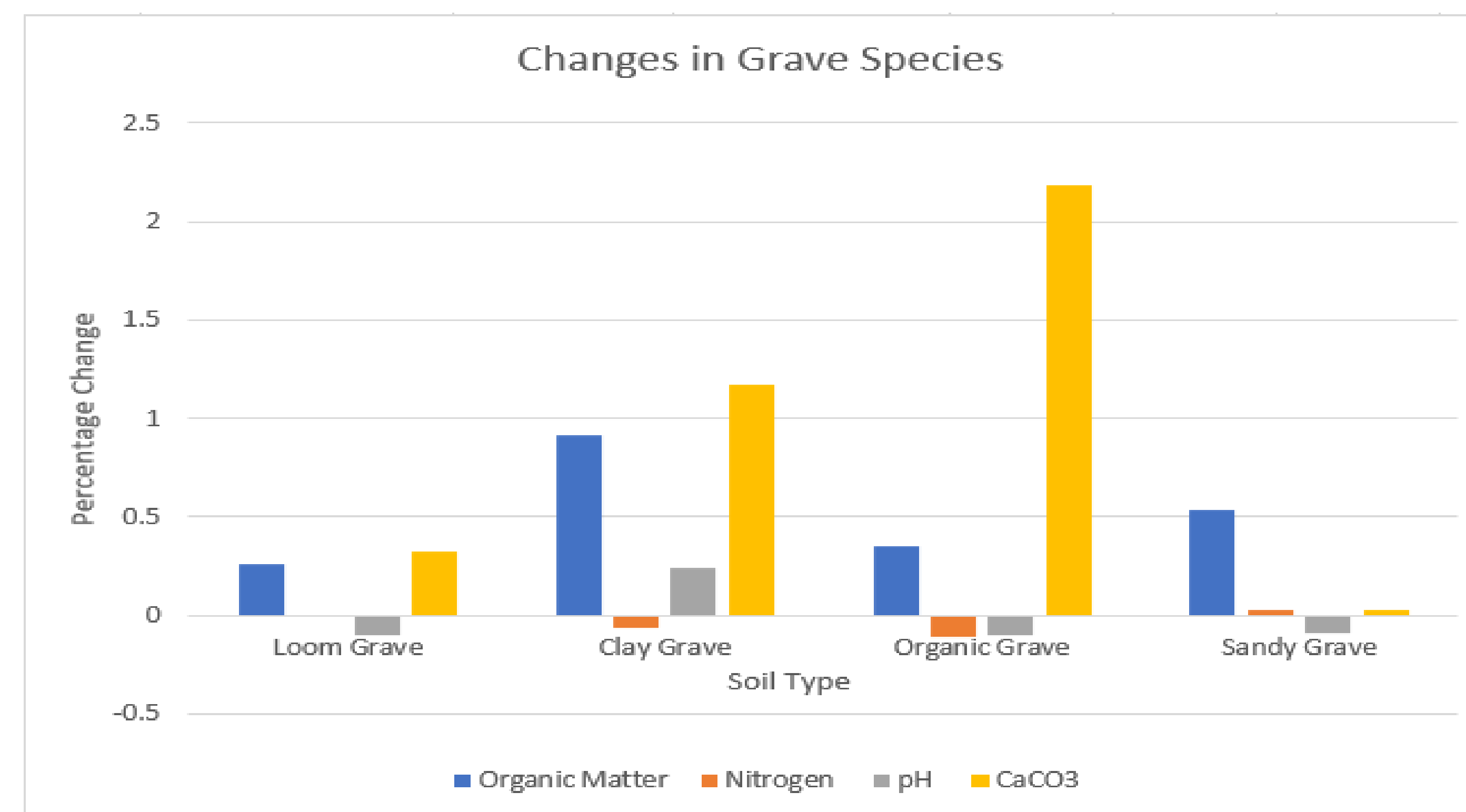


Figure 2: Chemical changes in the grave species throughout the process of decomposition

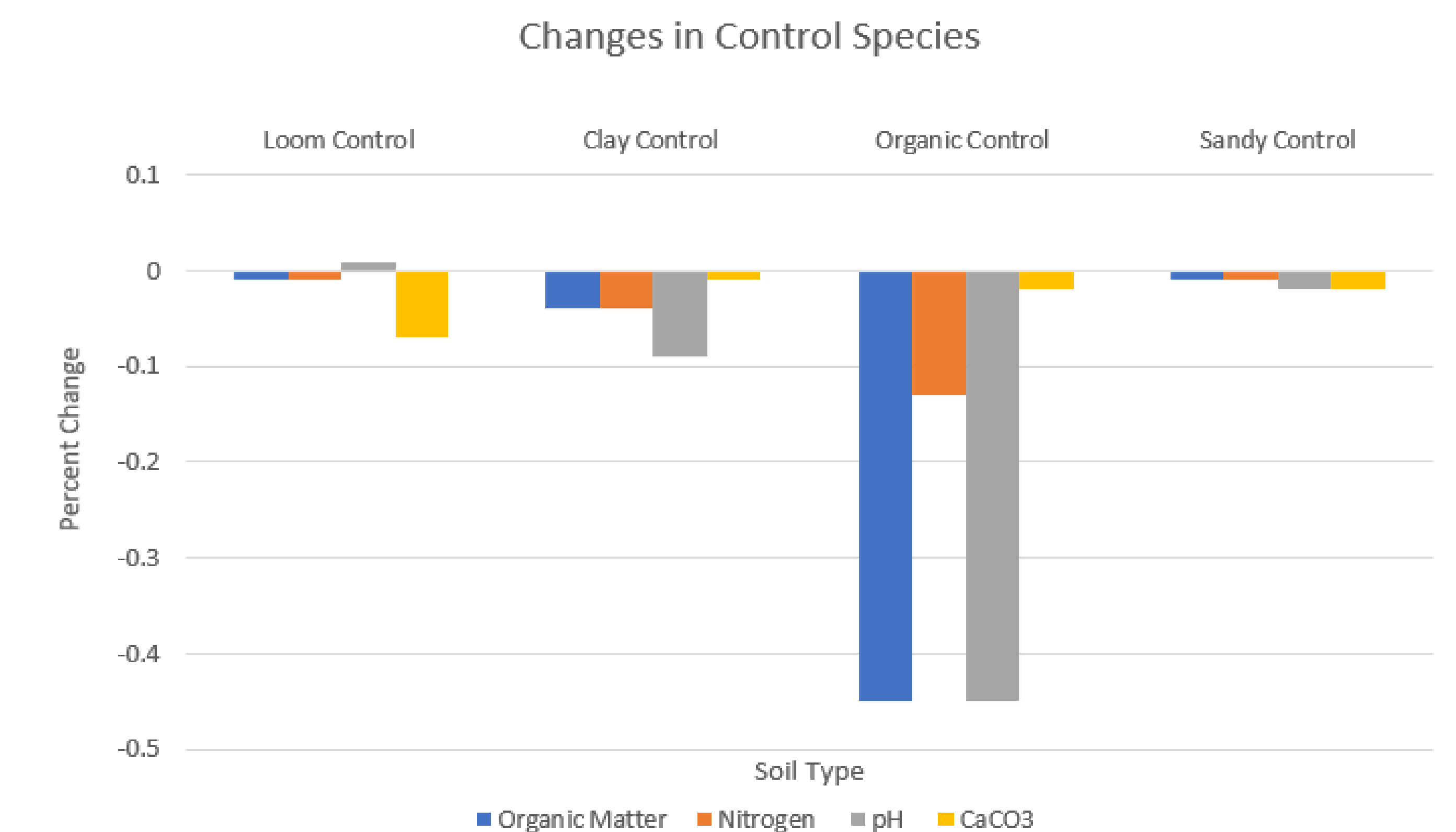


Figure 3: The chemical changes in the grave species throughout the process of decomposition.

Conclusion

- All three studies that were analyzed demonstrated that there would be some type of change in the chemistry of the soil, resulting in last effects
- Could provide numerous advantages for offices in smaller metro areas that may not have the technology that larger city, state, or federal labs do.
 - Could be done using simpler testing methods (pH and calcium levels) provides more of an opportunity for to do this in house, rather than outsource analysis.
- Could spur experiments and further investigations for a more in-depth analysis of environmental factors surrounding clandestine graves, once there are distinct chemical markers chosen.

References

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