

Weathering Perchlorate with microbes to Mend Mars for farming

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Secondary Sciences (7-12)

Graduation Solutions

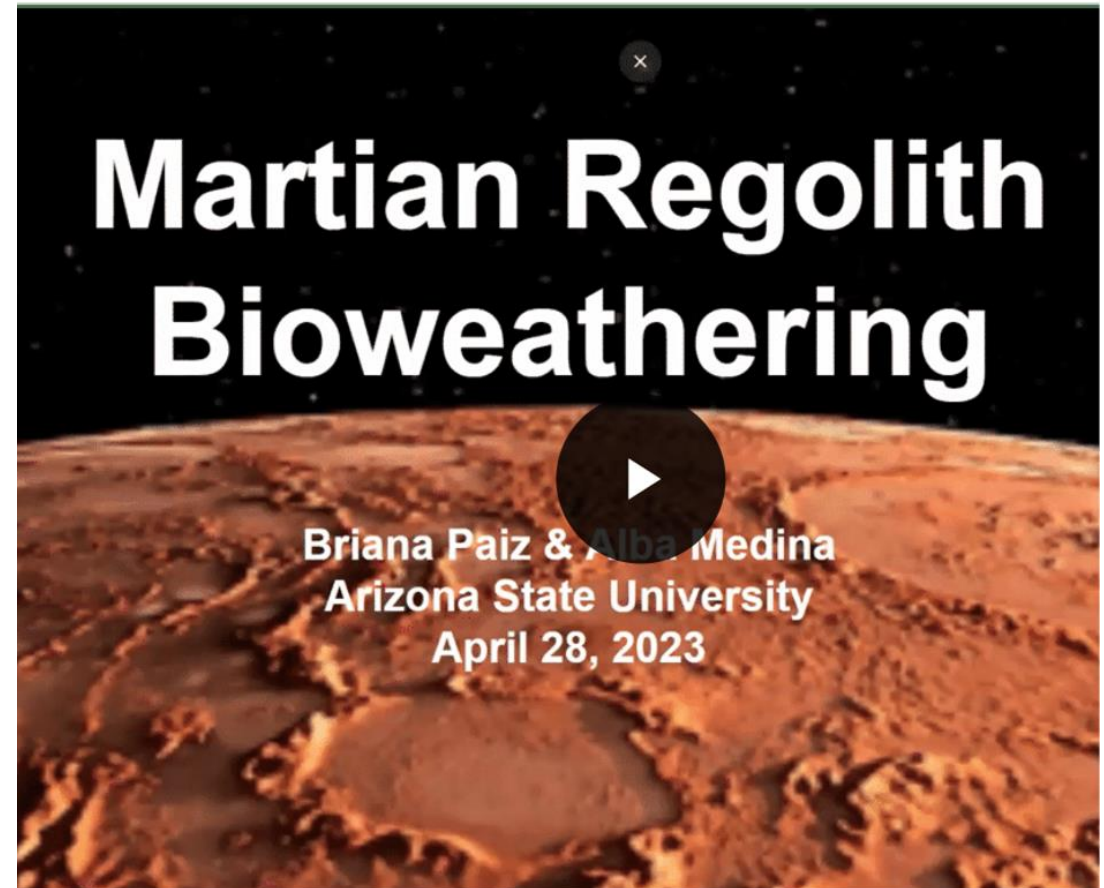
Mentors: Briana Paiz, Alba Medina, Anca Delgado



RET Lab Experience Research Summary

Research Background

- Mars colonies will need food
- Transportation is expensive and slow
- Mars is toxic to eat from
- Bacteria can reduce toxicity levels
- *Haloferax* likes high salt environments
- *Dechloromonas* likes normal salt levels
- Both eat Perchlorate, a Mars toxin



RET Lab Experience Research Summary

Research Objectives

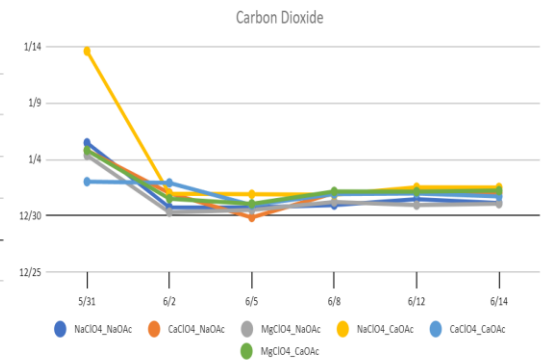
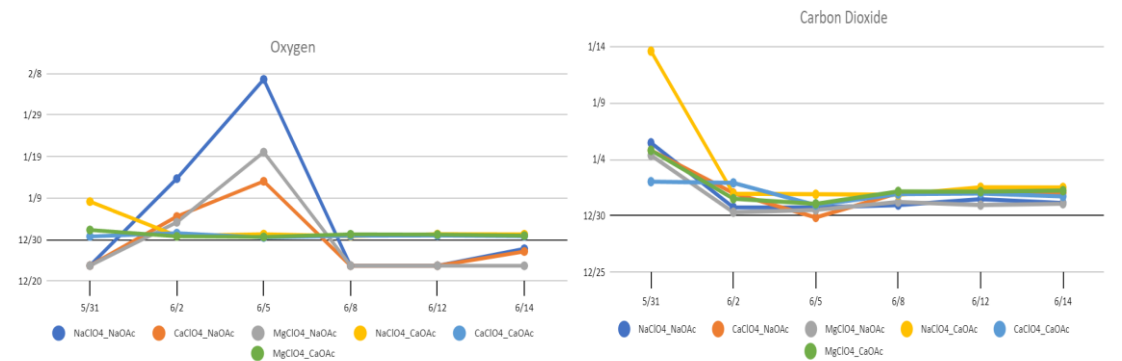
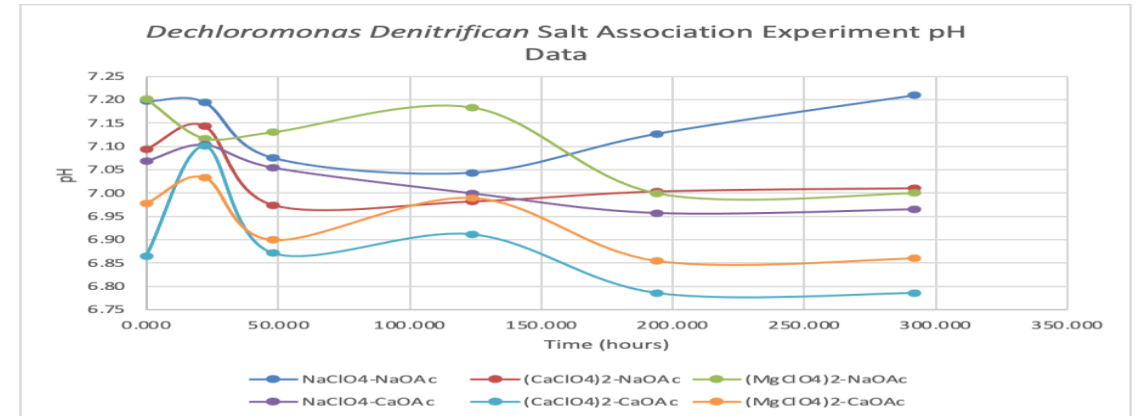
- Culture Haloferax Denitrificans and Dechloromonas Denitrificans in various salts to compare results
- Gas volume/pressure
- Gas content
- Perchlorate
- pH
- CO₂ gas
- Transparency
- HPLC (Acetate)



RET Lab Experience Research Summary

Research Conclusions

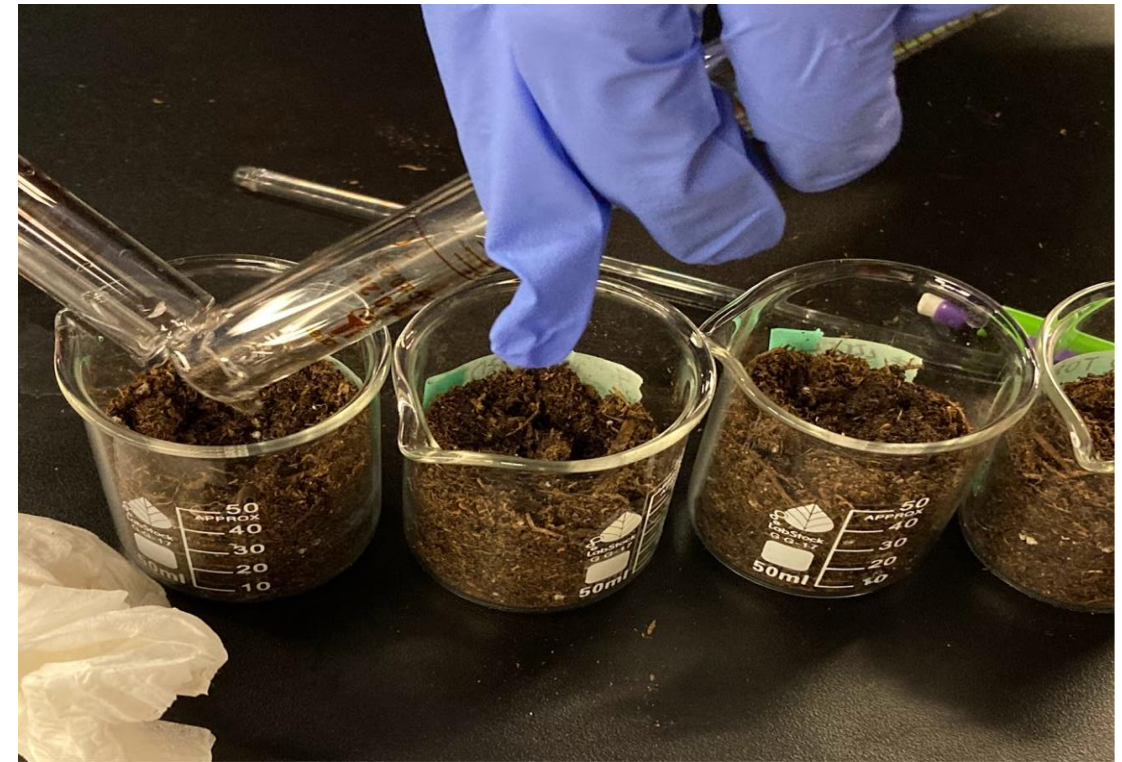
So far, secondary factors like pH, Headspace and others indicate Perchlorate is being reduced, but machine malfunction has prevented measuring the Perchlorate levels directly. Next month we should have those results.



RET Instructional Lesson Implementation

Lesson Description

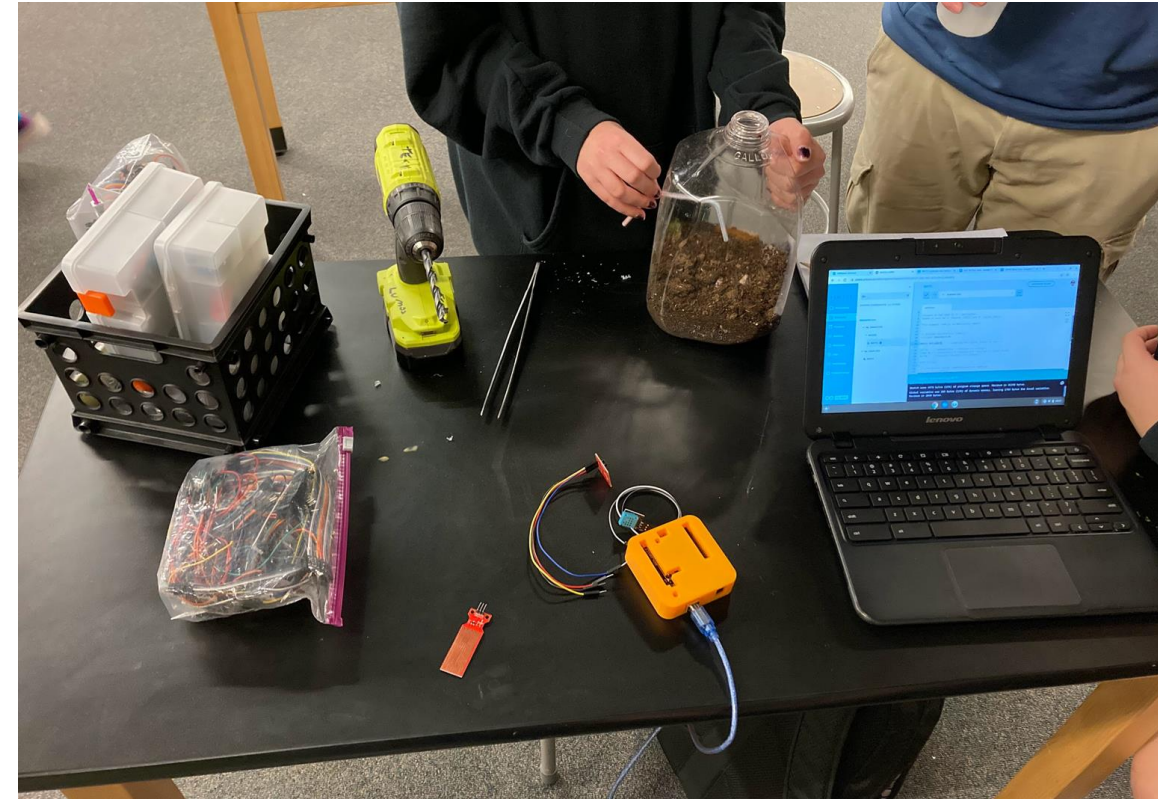
- ASU is finding out how to detoxify Mars for farming. We can find new microbes that eat Perchlorate by tracking Nitrate consumption.
- What is the minimum nutrient enrichment of Mars rock to make it farmable?
- Students will gather rock samples similar to Mars and enrich it a variety of ways for growing crops, and track Nitrate levels.



RET Instructional Lesson Implementation

Lesson Objectives

- Analyze reactions and reaction types (PS1B, PS2B, LS1D)
- Predict nutrient cycles in a closed system (LS2B-C, LS1B-C, LS4D, ESS2C-D, ESS3C, ETS1A-C)
- Setup a system monitor to optimize nutrient ratios (LS1D, LS1A, PS3B, LS3B, LS4B)



**Thank you!
Questions?**

**your name here
your email here**