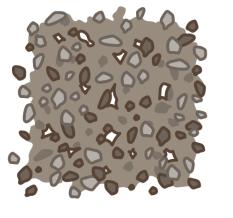


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Can you build on quicksand? Hypothesis Soil aggregate stability refers to the ability of soil particles to bind together This study hypothesizes that amendment of soil with Urea will enrich the natural population of ureolytic bacteria which upon the addition of Calcium Chloride will result in the stabilization of soils. VS Aggregates form through natural forces and organic substances, for example Soil Sample Enrichment Water Erosion Testing microbial by-products, cementing particles into micro- and macro-MICP stands for Microbially Induced Calcite Precipitation. It is a Experimental Design biogeochemical process in which certain bacteria, often belonging to the genera Bacillus and Sporosarcina, are used to precipitate calcium carbonate **Two Treatments: Burned and Unburned Microbial-Induced Calcite Precipitation** Grassy soil with Sandy soil wit Calcium Carbonate Organic Content Organic Content Calcium Water Ammonium Enrich Native Population (1) Collect sample and test physical properties (3) Pellet cells Enrich with Urea rich media and incubate Pores filled and 25°C in the dark cemented with Calcium Carbonate **Determine Urease Activity** It influences the engineering properties of soil, impacting factors such as VS ate individual colonies and screen for (6) Read absorbance of dilutions of Isolates **(4)** Plate dilutions of cells Quantify Calcium **Carbonate Precipitation** Forest fire remediation and the stabilization of coastal soils are applications that could benefit from a novel method to increase aggregate stability. Which Enrich sample with Urea and Calcium rich media (8) Drain media and weigh sample is why our research focused on two treatments, burned and unburned soil. Enrich on a Macro-scale and determine aggregate stability change Left to right, samples collected in the field, Oven for soil burning, our

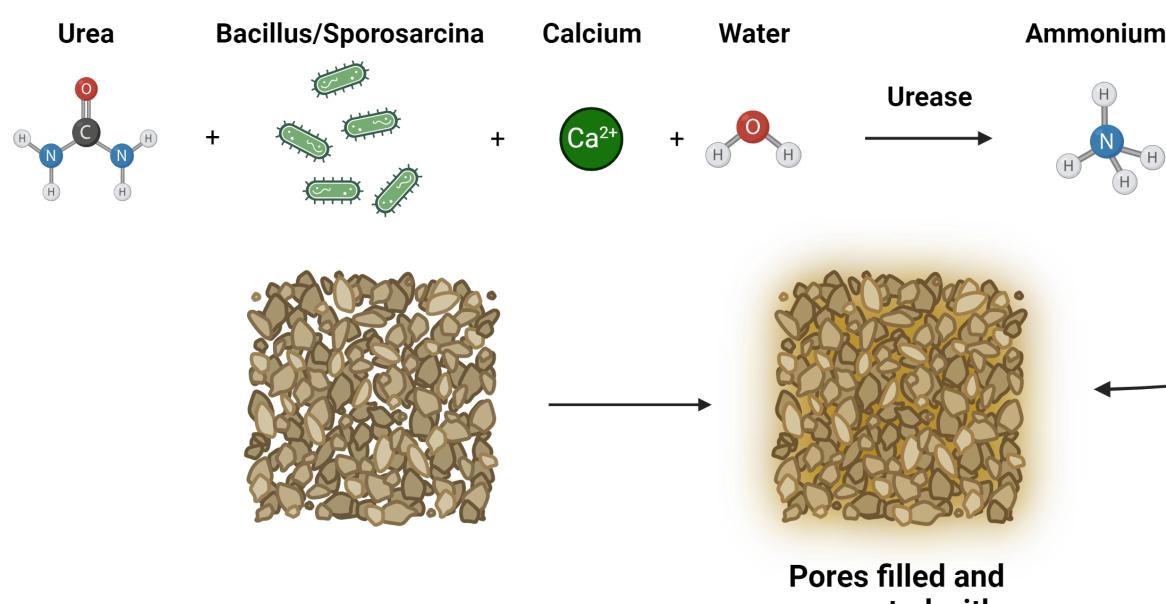
and resist breaking apart or disintegrating.







- aggregates.
- in the presence of Calcium.



compaction, shear strength, and permeability.



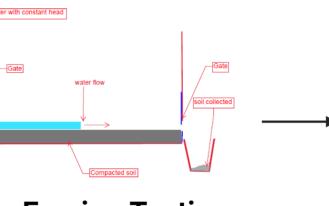
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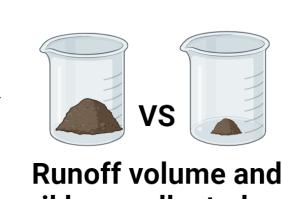




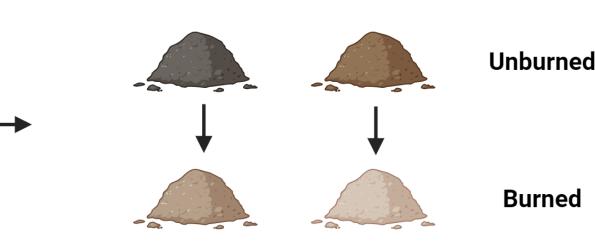
burned and unburned samples.

Using Microbial Induced Calcite Precipitation (MICP) to Stabilize Degraded Soils Christopher Legón, Pablo Robles, Mohamed Ismail, Ellithy Ghada, Hugo Castillo





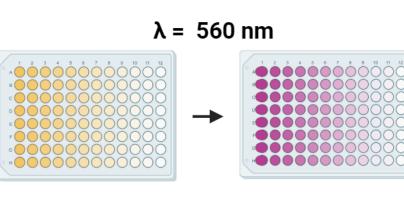






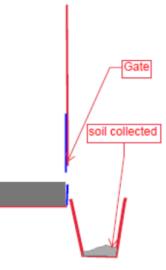






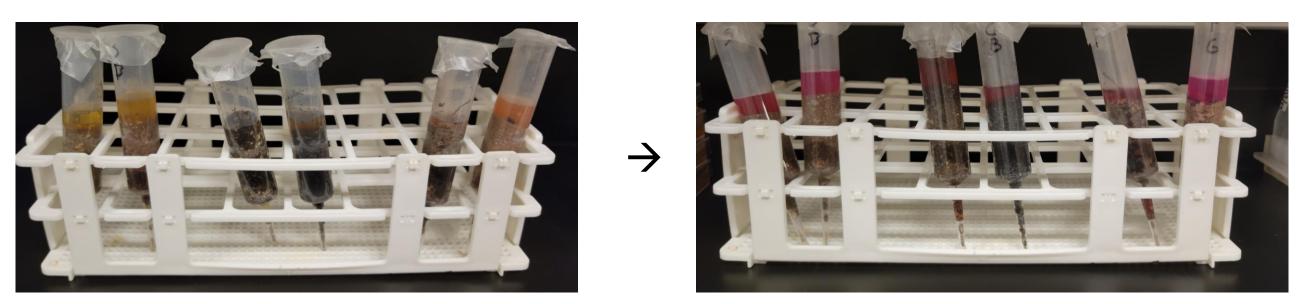


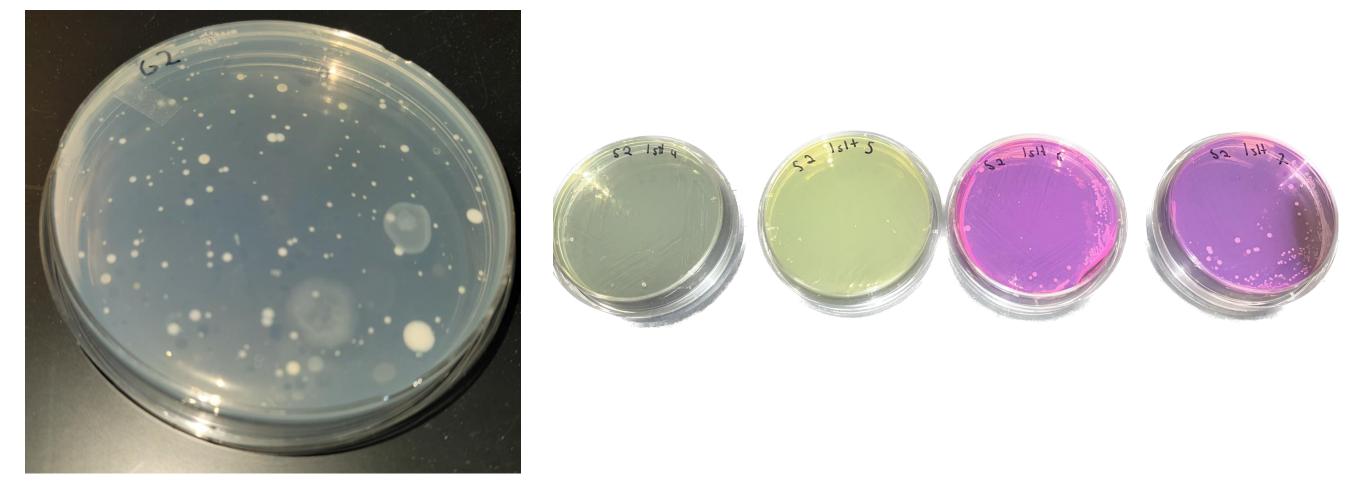


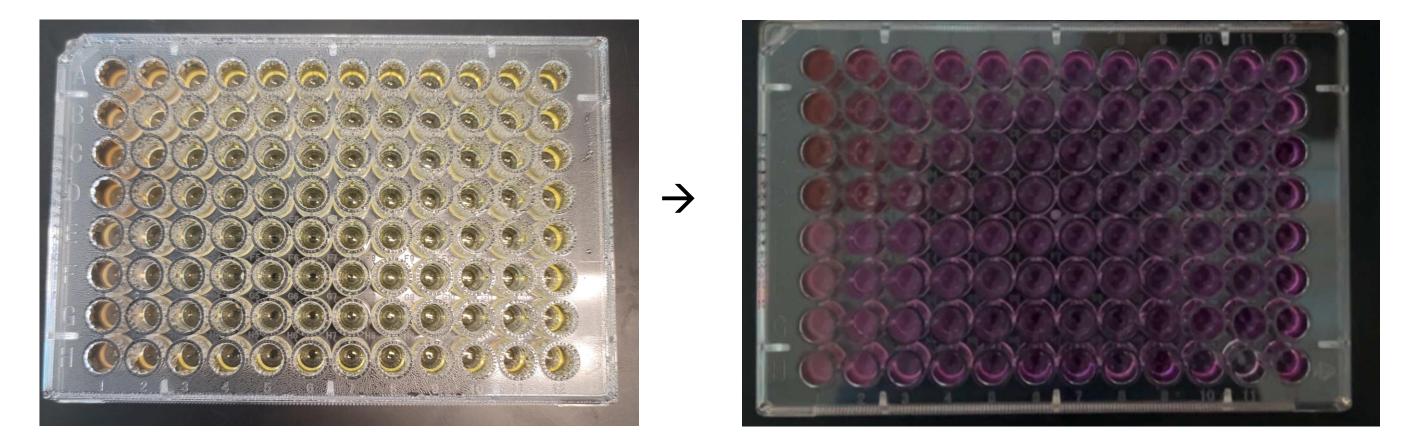


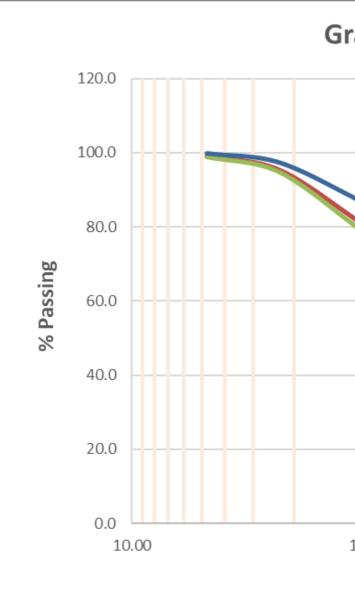
- and weigh difference

- l to dissolve Calcium Carbonate









• Gradation Curve of soil's sieve analysis.



flume.



Results

• This research is ongoing as it is funded by an Undergraduate Internal Grant.

Before and after of enriching the soil samples with urea broth.

• Plated cell dilution on the left and isolates with positive reaction on right.

• Reaction after plating soil dilutions for a Preliminary Urease Activity Assay.

Gradation Curve Soil w/ grass Soil w/o grass burned soil Particle Dia (mm)

Ongoing Research

• The next steps are to quantify the Urease Activity of all the isolates that tested positive. Using a gravimetric approach, we'll quantify how much calcium carbonate is being deposited in the samples. Lastly, we'll have to enrich samples on a macroscale to test how the treatment impacts aggregate stability using a modified water