

# The Effects of Different Concentrations of Calgon on Starch

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## Introduction

Sodium (Hexa) metaphosphate, better known as Calgon, is used as a deflocculant to disperse clay-based particles in archaeological samples. Archaeologists have identified starch granules in ancient pottery to determine what resources ancient people used. In order to gather these particles Calgon is sometimes used, but it is unknown if high concentrations of Calgon effect starch. Calgon itself is very economical and effective for cleansing artifacts yet the most effective concentration is unknown. Therefore, if we can determine what concentration is most effective for cleaning artifacts, it will improve the process of cleansing artifacts by saving time and money.



Image of ancient pottery sample

## Hypothesis/Prediction

Ho: The Concentration of Calgon will have no effect on the retention of starch granules in a sample.

H1: The Concentration of Calgon will have an effect on the retention of starch granules

Prediction: As the Concentration of Calgon Increases, starch retention will decrease.

## Methodology

1. Create Starch solution
  - a. .02g starch + 100ml H<sub>2</sub>O
  - b. dissolve 8 lycopodium (19855 spores/tab) in 5% HCl .
  - c. Vortex, Centrifuge and decant excess HCl
2. Create Calgon Concentration
  - a. 100 ml of H<sub>2</sub>O + .25 - 1 g of Calgon to create concentrations of 0,25,50,100%
3. Expose starch to Calgon
  - a. Add 10 ml starch solution to each test tube and centrifuge for 3 min @ 3300 rpm. Decant.
  - b. Add 10 ml of Calgon. Stir for 5 minutes then centrifuge, decant and vortex.
4. Make Slides
  - a. Use jagged end of wooden stick to place one drop (.05ml) of sample. Add 1 drop of glycerin. Mix well. Cover slip. Seal with nail polish.



## Results

Concentration (wbv, g/l)	# starch	# lycopodium	starch:lyco ratio
0%	22316	18	1239.78
25%	16443	44	373.70
50%	15552	75	207.36
100%	18478	100	184.78

Starch to *Lycopodium* Spores ratio by Calgon concentration

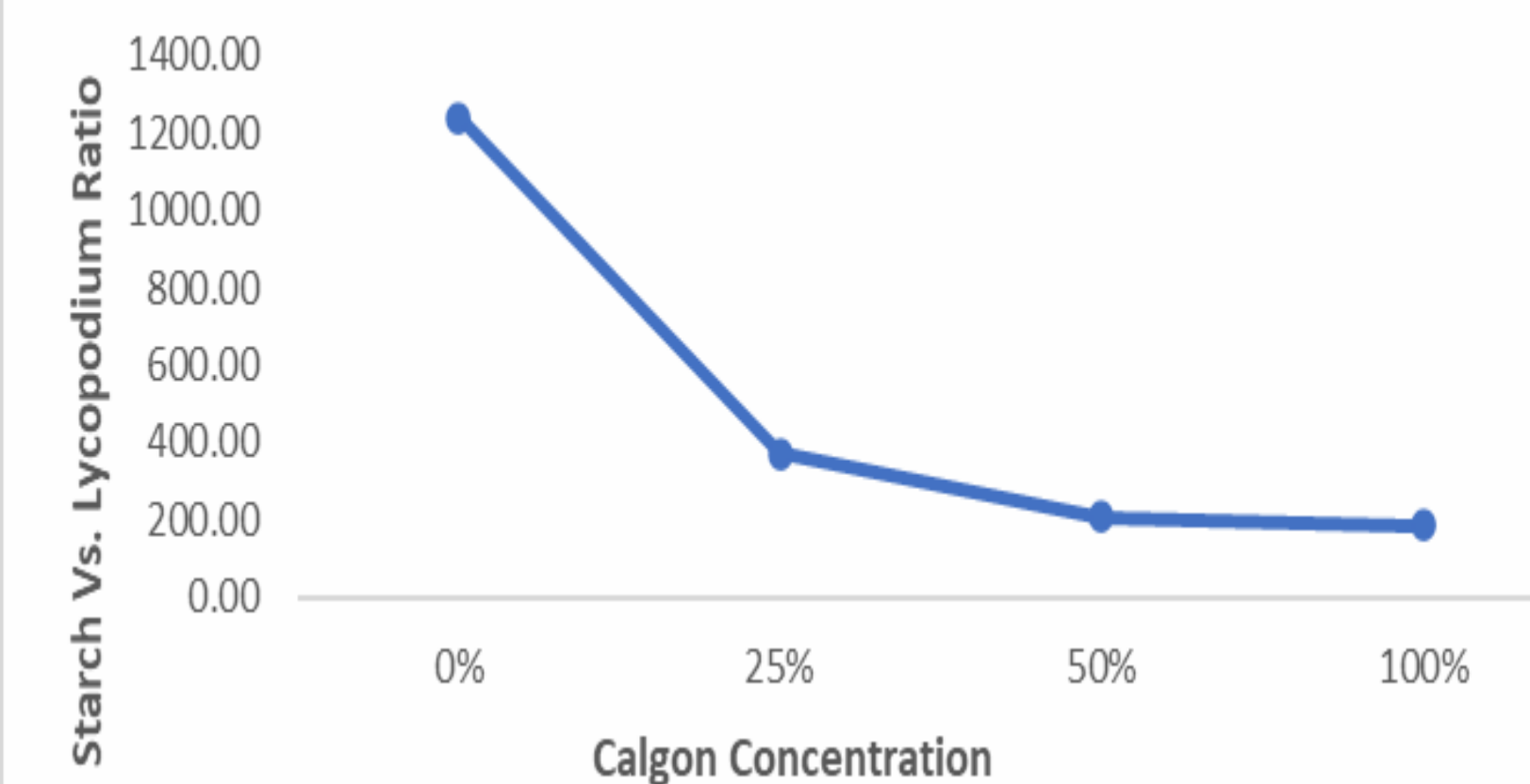


Figure.1 Displays the ratio between the amount of starch granules and lycopodium spores at different calgon concentrations

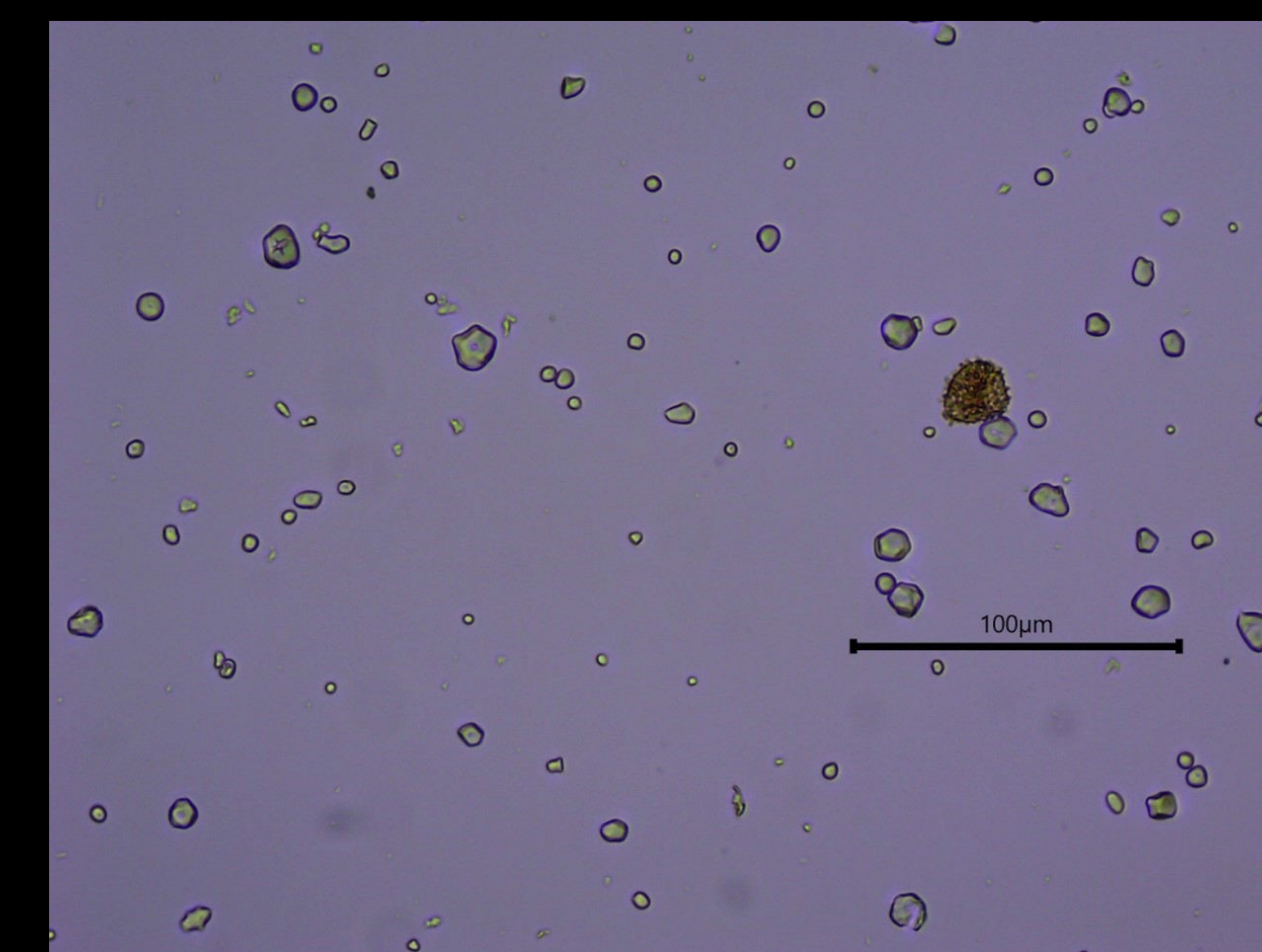


Image of both lycopodium and starch under the microscope to scale

## Discussion

Our results support both our Hypothesis and prediction. As the concentration of Calgon increased the amount of starch in the samples

Decreased to an extent. The 100% concentration ended up with more starch particles than both the 25% and 50% concentrations. This is most likely due to the Calgon failing to dissolve properly. During mixing.

## Future Directions

Moving forwards, this research will help provide data for determining how different Calgon concentrations effects the size of the starch particles.

## References

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