



[1]

The Sweet Spot: Sugar Concentration and Boba Pearl Texture

Fiona Lin

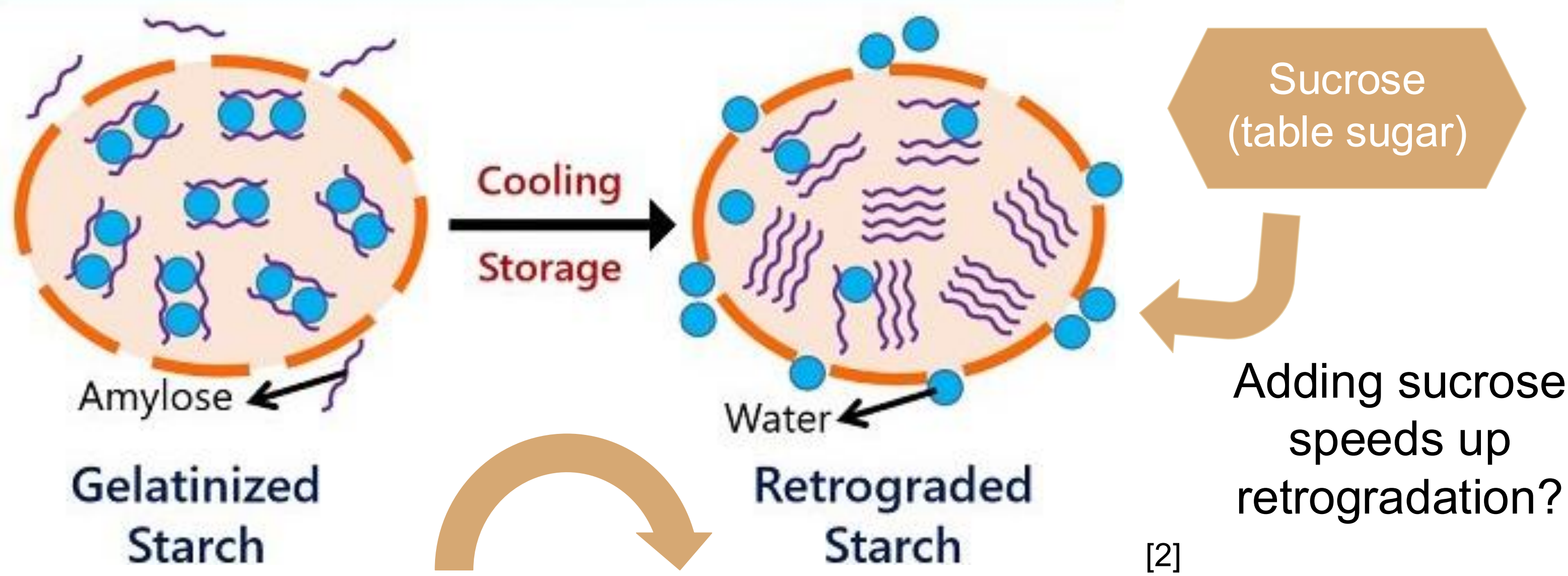
2.671 Measurement and Instrumentation



Abstract

Boba tea is a product with a significant economic value worldwide, where the chewiness of its tapioca pearls is valued. Boba pearls' texture toughens after soaking due to starch retrogradation. In previous works, it is hypothesized that higher sucrose content in soaking liquid speeds up the process of retrogradation. The Texture Analyzer was used to collect data on boba pearl texture after soaking in solutions of various sucrose concentrations over the span of 4 hours. The hardness slope is statistically significantly upward at 0%, 20%, 40% and 50%. The concentration slope is statistically significantly upward at 20%, 40% and 50%. All cohesiveness slopes are statistically significantly downward. This matches the theory that higher sucrose concentration yields tougher, chewier boba pearls.

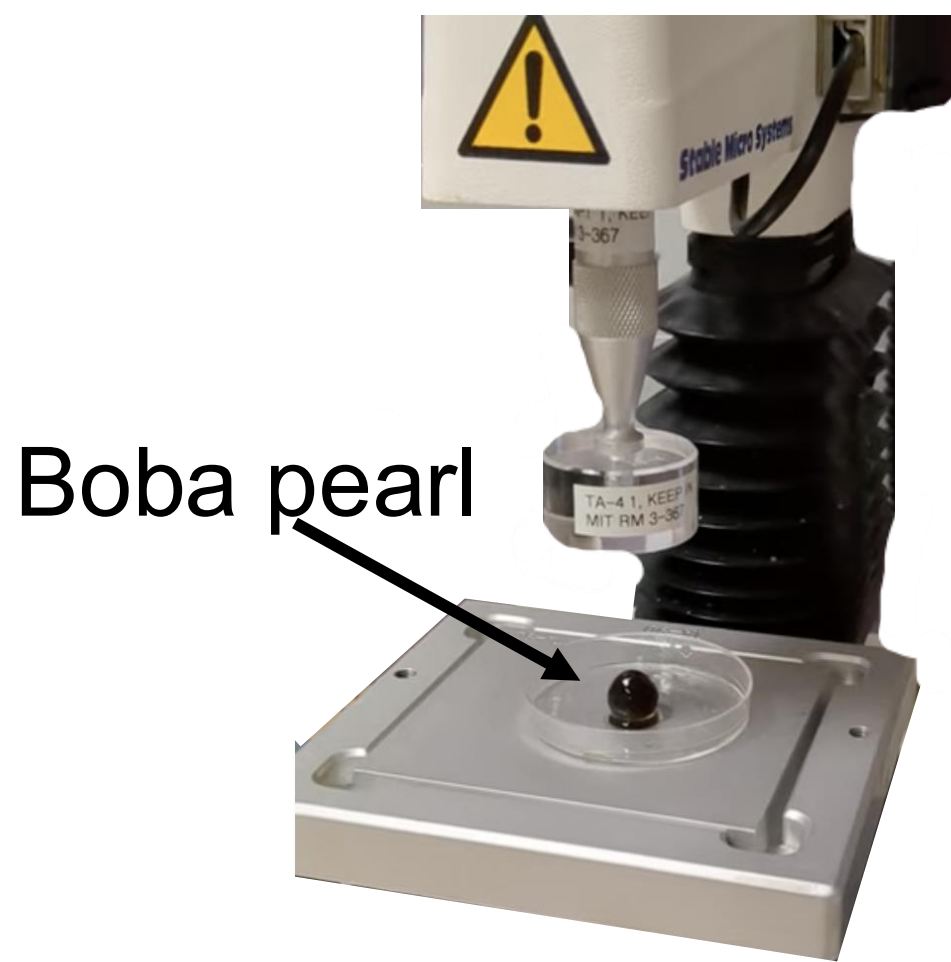
Background



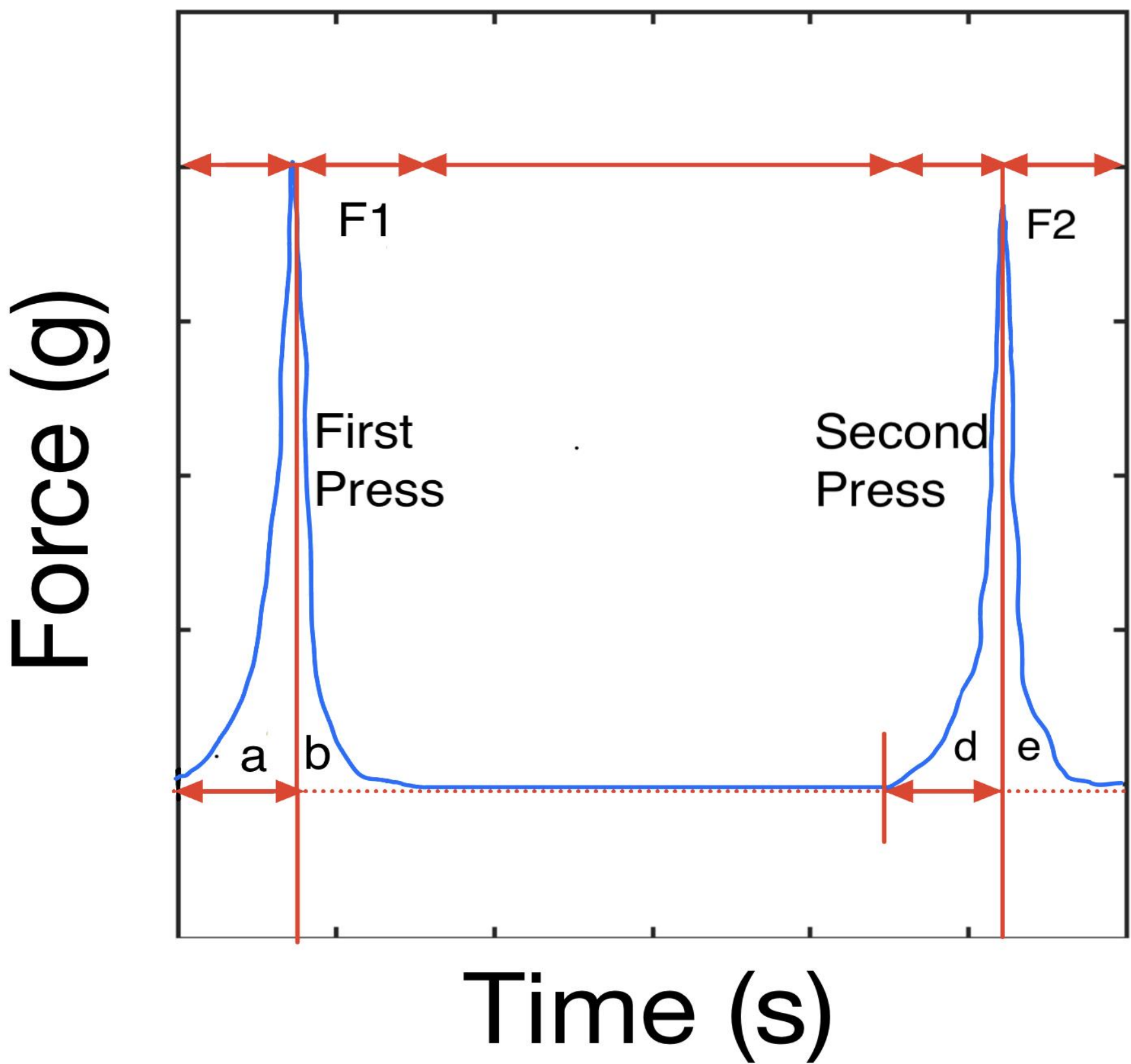
Freshly cooked boba:
chewy!

Stored cooked boba:
tough!

Methodology

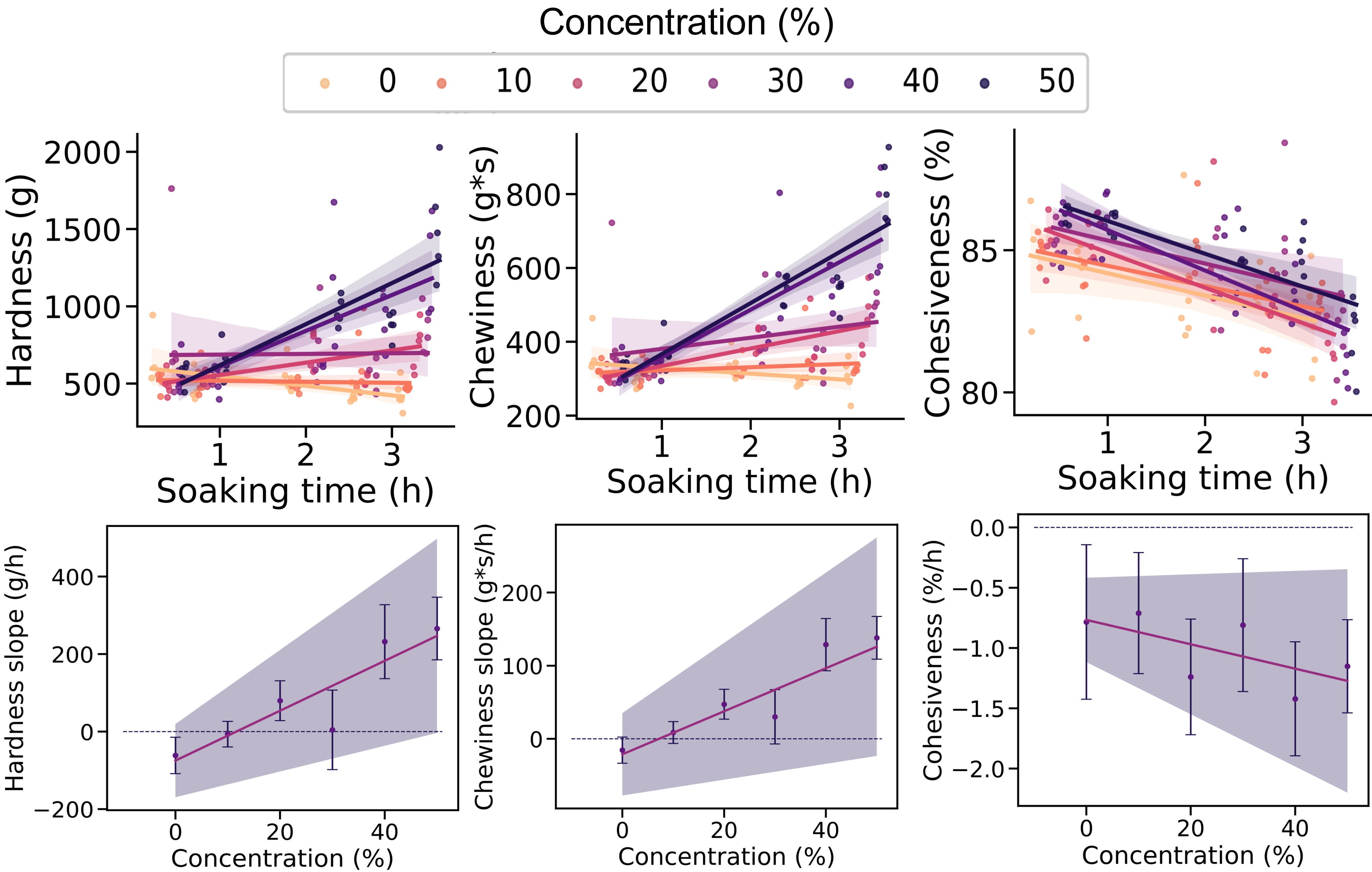


Measured on the
Texture Analyzer



[3]

Texture Results and Trends



Conclusions

- Sugar concentration has statistically significant effect on chewiness and hardness but not cohesiveness.
- Higher sucrose concentration yields tougher, chewier boba pearls for **some concentrations**.
 - Hardness slope is statistically significant **upward** at 0%, 20%, 40%, and 50%.
 - Chewiness slope is statistically significant **upward** at 20%, 40%, and 50%.
 - **All** cohesiveness slopes are statistically significantly **downward**.
- Standard error for all the datapoints is high, potentially from the irregularity of the purchased boba pearls.
- The results can help boba tea vendors to control the texture of their boba pearls by adjusting the sugar concentration.

Acknowledgements

I would like to give my thanks to Dr. Hughey, Prof. Wang, and Michael Gilbert for help with this project.

References

- [1] <https://www.redbubble.com/i/kids-t-shirt/Bubble-Tea-Cute-Kawaii-Cat-Hugging-Boba-Drink-by-BobaTeaMe/41805109.MZ153>
- [2] <https://biologyreader.com/retrogradation-of-starch.html>
- [3] <https://www.rheologylab.com/services/texture-analysis/>

May 9, 2023

[3]