

Temperature Affects Kimchi Fermentation

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BIO 306 General Microbiology

Results



Figure 1: Kimchi incubating

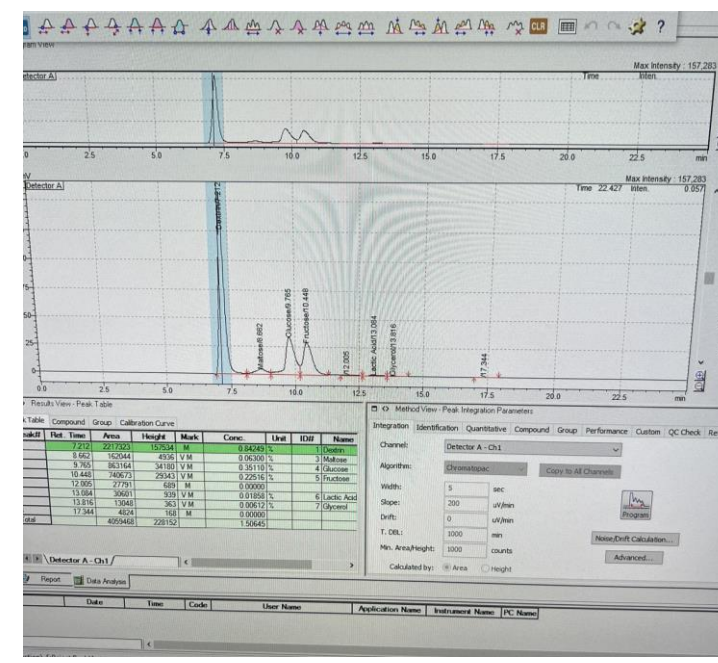


Figure 2: HPLC chromatogram



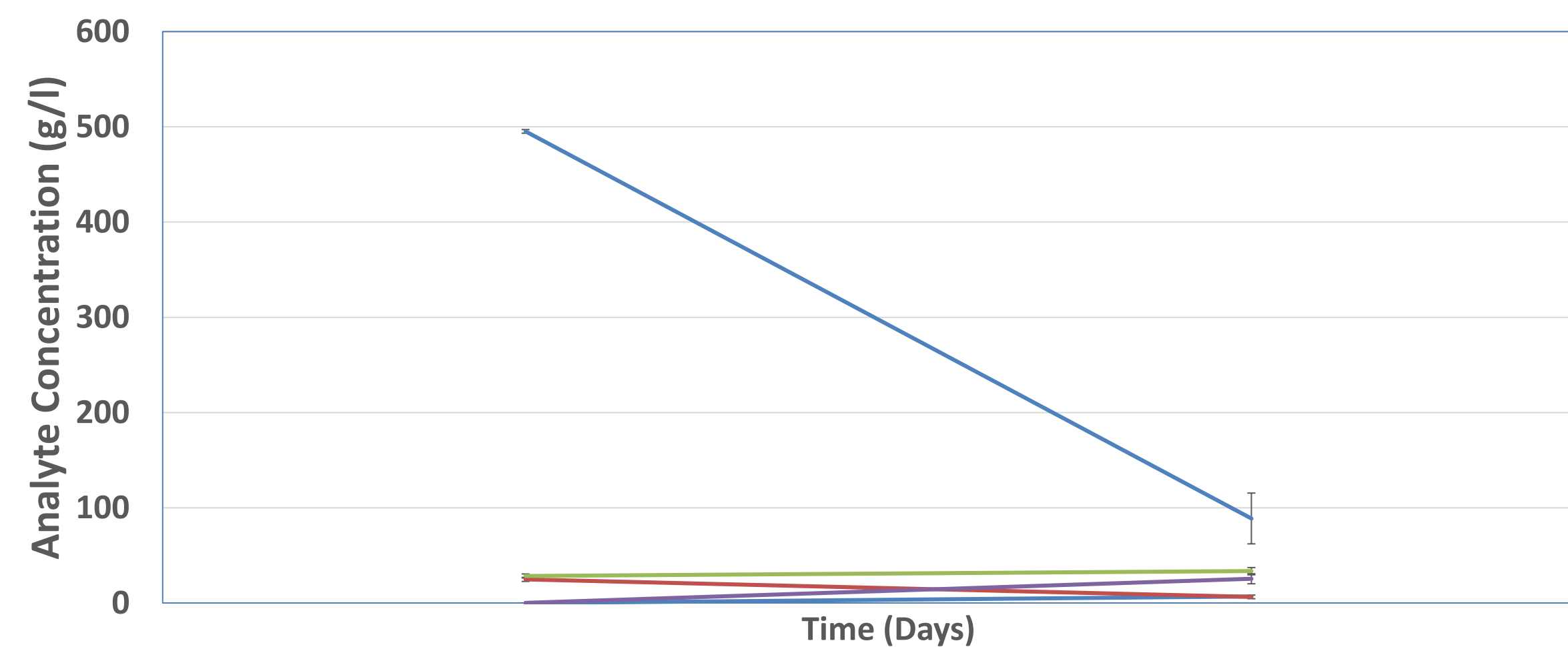
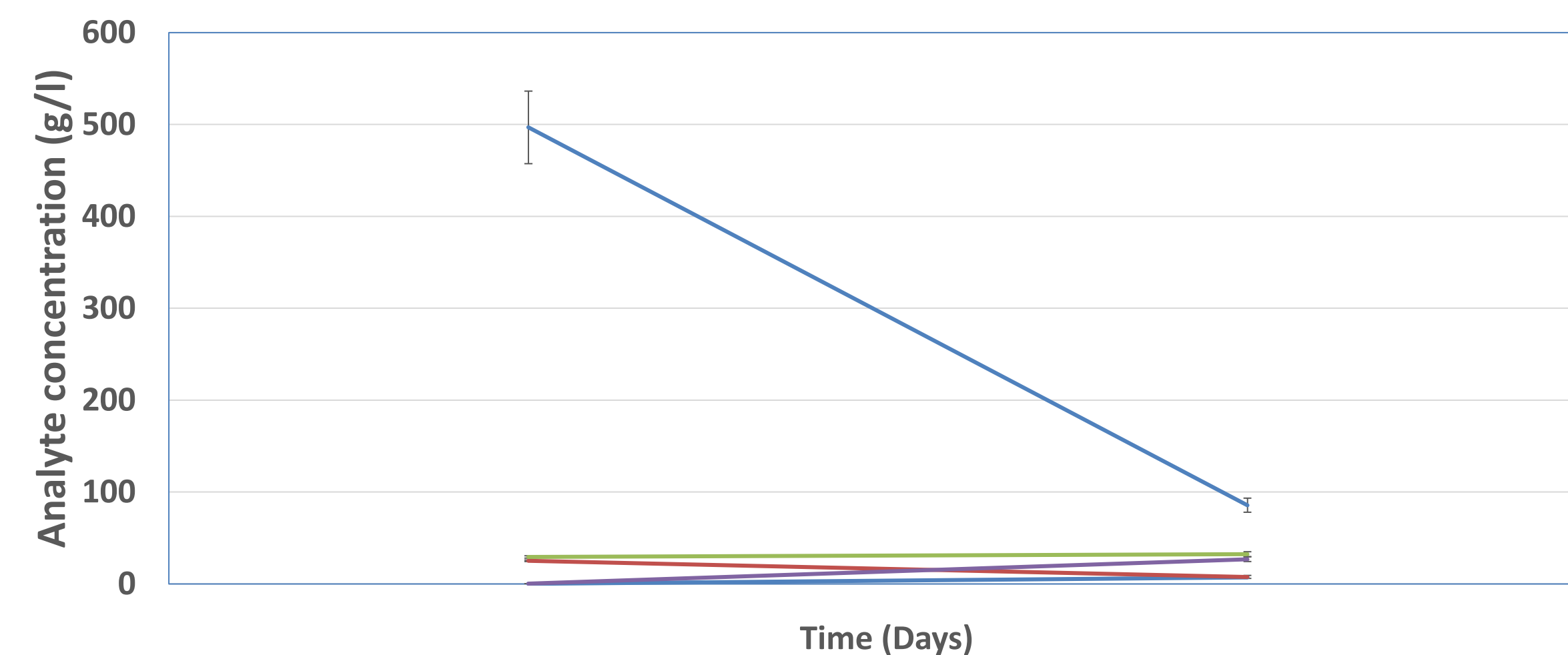
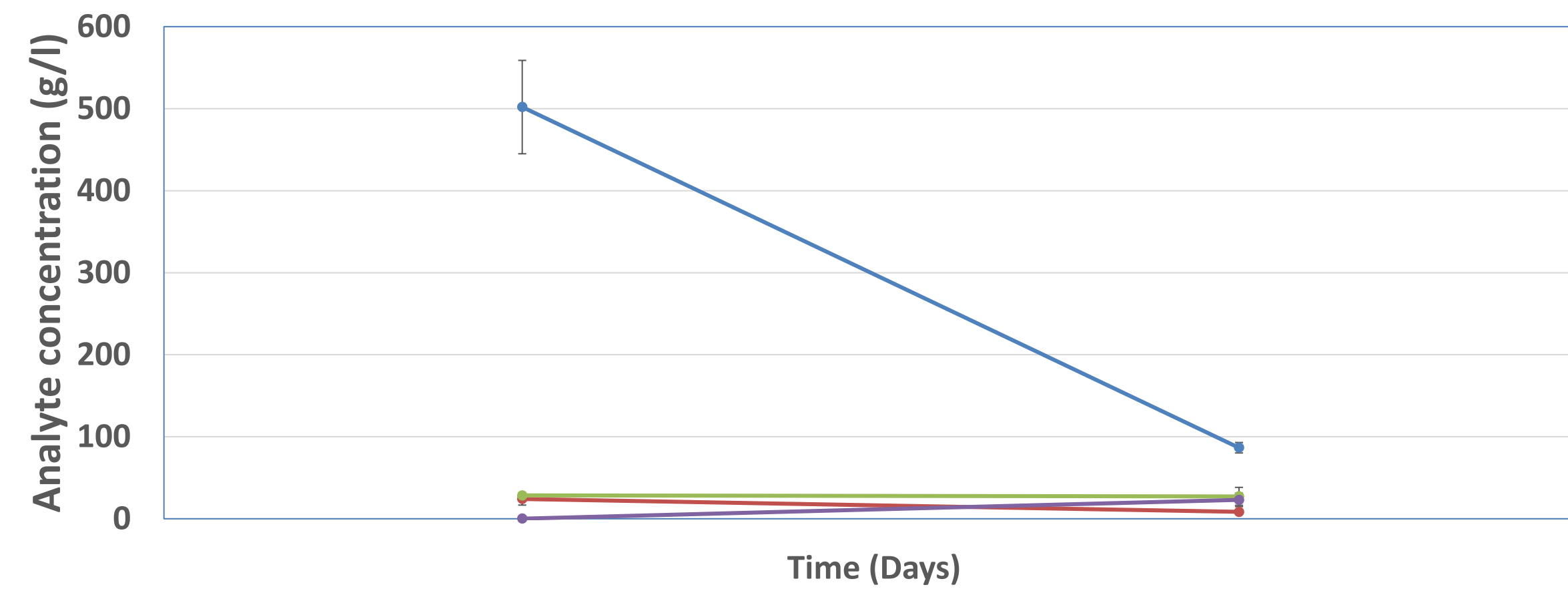
Figure 3: Kimchi samples being centrifuged

Overview

Temperature may be important when making kimchi. Temperature extremes could affect the yeast and bacteria involved in Kimchi fermentation (Fig. 1). Our goal was to analyze the effects of varying temperature concentrations during Kimchi production (Eq. 1, Figs. 4-6).

Methods

One large batch of Kimchi was made (12 replicates) then packed into 10 Mason jars separated into three groups and one control. Triplicates were stored at different temperatures (4°C, 18°C, and 30°C) and allowed to ferment for 14 days. Liquid samples were taken from each jar at day zero and day 14, centrifuged (Fig. 3), diluted 1:10 with water, and analyzed by HPLC (Fig. 2).



Blue: Dextrin Grey: Glucose Orange: Fructose Red: Maltose

Conclusions

- Carbon sources were fermented over time. Ee did not detect any fermentation products (ethanol, organic acids).
- Temperature did not affect reactants or products in Kimchi fermentation.
- Since we did not detect any differences with temperature, other factors such as pH and salt concentration may be more important.

Citations

- Park, B., Yang, J.-S., Moon, E. W., Seo, H.-Y., & Ha, J.-H. Influence of Capsaicinoids Content on the Microbial Community during Kimchi Fermentation. *Journal of Microbiology and Biotechnology*. October 2019. Vol 29, issue 10, Pg. 1580-1590.
- Lee, D., Kim, S., Cho, J. *et al.* Microbial population dynamics and temperature changes during fermentation of kimjang kimchi. *J Microbiol.* **46**, 590–593 (2008).

