

Fermentation: An Analysis of Craft Beverages and Microbiological Impacts on Fermentation

Clemson University Extension

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Introduction

Clemson University offered an in-depth, analytical exploration of fermentation science through the USDA-funded Science Influencers program and the Research and Extension Experience for Undergraduates (REEU). These initiatives provided a structured framework for undergraduates like me to investigate the biochemical mechanisms driving fermentation, including microbial dynamics, metabolic pathways, and environmental impacts on fermentation efficiency (Mannaa et al. 2021). This program enriched my understanding of fermentation science by blending theoretical learning with hands-on lab work; additionally, this opportunity deepened my perspective on properly using analytical research to advance food and beverage innovation locally and commercially.

Keywords: Fermentation Science, Microbiology, Food and Beverage Research, Environmental Factors, Fermentation efficiency

Clemson University Food Systems and Safety Extension

Clemson University's Food Systems and Safety Extension team is dedicated to providing expert knowledge and safety guidelines across every aspect of food, from harvesting to canning, processing, and packaging (Food Systems and Safety). This team draws from a vast network within Clemson University, incorporating insights from professors across multiple disciplines, cutting-edge research, and collaboration with academic and local communities. The interdisciplinary approach allows students like me to connect with field experts and further engage with their peer-reviewed research, which ultimately enriches our understanding of food systems and safety.

Purpose and Objectives

Throughout my summer internship, I worked closely with Dr. Paul Dawson, a professor at Clemson University, and Alex Thompson, a Clemson Extension agent in the upstate area of South Carolina. The internship centered around two main goals: establishing a fully functional fermentation lab to support future research at Clemson University and designing a research experiment for the upcoming Fall semester. This experience allowed me to apply my food science knowledge in a laboratory setting, laying the groundwork for a fermentation lab that would enhance the University's infrastructure and contribute to advancing fermentation science.

Methods and Procedures

During the internship, Thompson assigned various scientific readings, instructional videos, and practical experiences that gave me an in-depth understanding of commercial brewery operations and laboratory procedures. This multifaceted approach provided the technical knowledge and skills needed to grasp the complexities of fermentation, quality control, and the scientific principles behind large-scale production. Building on this knowledge, we developed an

experiment that is now being further expanded in the Fall 2024 semester at Clemson University. Dr. Dawson and Alex's expertise and guidance greatly enriched my analytical and scientific understanding across various areas of food science. I'm incredibly grateful that I got the chance to work with them throughout the summer.

Results and Findings

The USDA REEU internship expanded my understanding of the Extension role and deepened my knowledge of fermentation science and commercial brewing. Throughout the position, I actively achieved our two key objectives: setting up a fermentation lab at Clemson University, which included installing essential equipment for diverse experiments, and preparing a research project through a blend of scientific literature, instructional videos, and hands-on experience.

Conclusion and Recommendations

Throughout my internship experience, the knowledge that has been provided allowed me to leverage my practical skills to contribute positively to the upstate community and leave a lasting impact on Clemson University. By actively participating in my lab construction efforts, I advanced my understanding of fermentation and commercial brewery operations and created a resource that will benefit future students and researchers. The lab's capabilities will support ongoing research initiatives, foster innovation in brewing and fermentation, and help our local and commercial brewers and students keep their products to the quality and safety their consumers expect.

References

Food Systems and Safety, www.clemson.edu/extension/food/index.html. Accessed 16 Oct. 2024.
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