

# **Analysis of Substrates for a Continuous Fermentation Reactor for Mead**

A Major Qualifying Project Report

submitted to the Faculty

of the

WORCESTER POLYTECHNIC INSTITUTE

In partial fulfillment of the requirements for the

Degree of Bachelor of Science

by



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Date: March 21, 2022

Approved:

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Advisor

*This report represents the work of WPI undergraduate students submitted to the faculty as evidence of completion of a degree requirement. WPI routinely publishes these reports on its website without editorial or peer review. For more information about the projects program at WPI, please see <http://www.wpi.edu/academics/ugradstudies/project-learning.html>*

### Abstract

In the preparation of iQhilika, a traditional mead of the Xhosa of South Africa, roots are used to immobilize yeast, allowing for the continuous fermentation of the must that passes through the packed column. Dr. Garth Cambray's continuous fermentation reactor design was inspired by this traditional practice. Our prototype reactor on campus is based on Dr. Cambray's design, and was originally designed using ginger root as the biomass substrate to immobilize the yeast. In this project, we set out to try several types of biomass substrates to work as a replacement for ginger; dried apple, lemon rinds, orange rinds, habanero peppers, and jalapeño peppers. We fermented small batches of mead using each of these substrates, and used a GC-MS to observe how the different biomasses affected the fermentation process, and whether they imparted their own flavors onto the resulting mead. Additionally, we tested the orange rinds as the substrate in our packed column fermentation reactor.

This MQP contains information deemed confidential to the business interest of the industrial sponsor. Please contact Stephen Kmiotek at [skmiotek@wpi.edu](mailto:skmiotek@wpi.edu) for additional information.