FOOD SCIENCE AND HUMAN NUTRITION
COLORADO STATE UNIVERSITY

Gusmer Enterprises, Inc.®

EFFECTS OF YEAST PITCH RATE ON HIGH GRAVITY HARD SELTZER FERMENTATION WITH NUTRIENT SUPPLEMENTATION

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INTRODUCTION

This experiment was meant to test the performance of Gusmer Enterprises, Inc's new Micro*Elements*® Hard Seltzer HG yeast nutrient blend on different yeast strains at different pitch rates. As this was a new product, understanding how it performed with different yeast strains is crucial to its use in production spaces. It is already known that nutrient supplementation in seltzer production is necessary, however this experiment aimed to define the nutrient's impact on fermentation between yeast strains and see if a variation in pitch rate has an effect on overall fermentation kinetics.

Chr. Hansen Viniflora® Merit™, Renaissance Avante™, and Renaissance Viva™ yeasts were chosen for their high alcohol tolerance and sugar conversion rate. Pitch rates of 0.5x10^6, 1.0x10^6, and 1.5x10^6 cells/mL/°P were chosen. pH, specific gravity, and temperature were tracked and charted daily for 14 days.

HYPOTHESIS

The effect of increasing yeast pitch rate in a high Plato substrate deficient in Free Amino Nitrogen (FAN) and micronutrients supplemented with Gusmer Micro*Elements*® Hard Seltzer HG dry yeast nutrient will result in a faster time to complete depletion of fermentable carbohydrates.

BACKGROUND

- High gravity dextrose based substrates are deficient in vital nutrients yeast need to grow and multiply.
- Nutrients critical to yeast vitality are Free Amino Nitrogen (FAN) sources and other trace minerals, such as calcium and zinc.
- The use of nutrient supplement additions into high gravity sugar substrates have shown to greatly improve yeast vitality over the course of the fermentation cycle.
- Gusmer Enterprises, Inc. have developed a new nutrient, Micro*Elements*® Hard Seltzer HG, to be tested with their established commercial yeast strains with variable pitch rates.

METHODS

- All vessels, lids, airlocks, and tools were cleaned and then sanitized
- 460 grams of powdered dextrose and 6.6 grams of Micro*Elements*® Hard Seltzer HG nutrient were added to each vessel to reach a starting gravity of ~26.5°Plato
- 9 liters of water were boiled and 1 liter was added to each vessel
- Each vessel was then mixed until sugar and nutrient fully dissolved
- Each vessel was cooled to 25°C
- Each yeast was weighed out to hit desired pitch rates
- Each vessel was inoculated with the appropriate yeast and pitch rate
- Each vessel was fitted with a lid, airlock, and left at room temperature
- Data including pH, temperature, and specific gravity was recorded for 14 days
- Final samples were tested for alcohol on an Anton Paar Alcolyzer and DMA 4500 to develop alcohol production curves

Name	Yeast strain	Pitch rate (cells/mL/°P)	Dry weight (grams)
A1	Avante™	0.5x10^6	0.79
A2	Avante™	1x10^6	1.59
A3	Avante™	1.5x10^6	2.38
M1	Viniflora® Merit™	0.5x10^6	0.39
M2	Viniflora® Merit™	1x10^6	0.79
M3	Viniflora® Merit™	1.5x10^6	1.18
V1	Viva™	0.5x10^6	0.57
V2	Viva™	1x10^6	1.15
V3	Viva™	1.5x10^6	1.72

CONCLUSION

We found that varying the yeast pitch rate with the use of Micro*Elements*® Hard Seltzer HG affected the rate of depletion of fermentable sugars with the yeast strains tested. While pitch rate affected the speed of initial carbohydrate usage it did not impact total fermentation time. Each yeast and pitch rate yielded similar time to completion.

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RESULTS