

Precision Yeast Nutrition: Improving Fermentation Performance with MicroElements Brew Powder

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What You'll Learn Today

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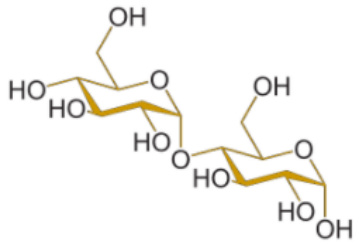
What Do Yeast Need?



Carbon Source (Sugars)

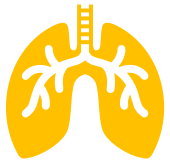
- Glucose, maltose, and maltotriose found in wort are the main fermentable sugars derived from malt
- These sugars provide both energy (via glycolysis and fermentation) and building blocks for cell components

Nitrogen Source

- Yeast needs assimilable nitrogen for protein and nucleic acid synthesis
- Comes from amino acids, peptides, and ammonium ions
- All malt wort is almost always sufficient in FAN

Image Source: Structure of maltose. Adapted from *Maltose2.svg*, created by NEUROtiker, Wikimedia Commons, Public Domain.

What Do Yeast Need?



Oxygen (at the start)

Required during the lag phase for:

- Sterol and unsaturated fatty acid synthesis
- Building up reserves before anaerobic fermentation



Minerals and Vitamins

- Such as zinc and calcium. More on this later!



Other Important Conditions

- Temperature, pH, osmotic pressure, alcohol tolerance, pitch rate and viability

Brewing yeast DO NOT need:

- Diammonium phosphate (cheap, inorganic nitrogen)
- Urea (not used much in beer, ethyl carbamate concern)
- Fillers, bulking agents or allergenic ingredients (soy)

Yeast Nutrients in Brewing



When might we need nutrients?

High Gravity Brewing

Brewing a wort with a higher OG than the intended final beer, then diluting it with water after fermentation to reach the target ABV and volume. This stresses yeast due to higher osmotic pressure and alcohol, so yeast nutrients are important to support cell health and fermentation efficiency.

Adjuncts

Beer brewed with fermentable sources beyond malted barley (corn, rice, sugar, oats). Adjuncts often dilute natural nutrients found in malt, making supplemental yeast nutrients essential to avoid sluggish or incomplete fermentations.

Propagation

The controlled growth of yeast from a small culture to a larger population before pitching. Proper nutrients promote increased biomass and ensures yeast build strong membranes and reserves (sterols/glycogen), leading to healthier, more resilient cells.

Serial Re-pitching

Reusing yeast harvested from one fermentation to inoculate the next batch. Nutrient additions help maintain yeast viability/vitality and consistency across generations, reducing the risk of performance decline or off-flavors.

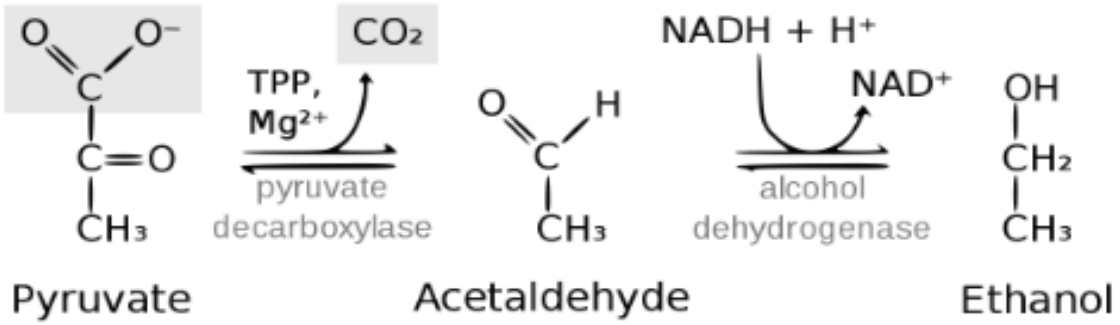
Yeast Nutrients in Brewing

Commercial yeast nutrients combine trace minerals, nitrogen sources and vitamins to **supplement** the natural nutrient content of wort.

- Healthy yeast growth, reproduction and biomass increase
- Consistent and efficient fermentation performance
- Improved attenuation and ethanol yield

- Reduction of off-flavors (sulfur, diacetyl, fusel alcohols, acetaldehyde) through healthier yeast
- Viability over time/through yeast generations

Yeast Nutrients in Brewing: Zinc



Zinc is an essential cofactor for **alcohol dehydrogenase**, the enzyme that converts acetaldehyde into ethanol.

No extra ATP produced, but NADH is oxidized back to NAD^+. This recycling allows glycolysis to keep running anaerobically.

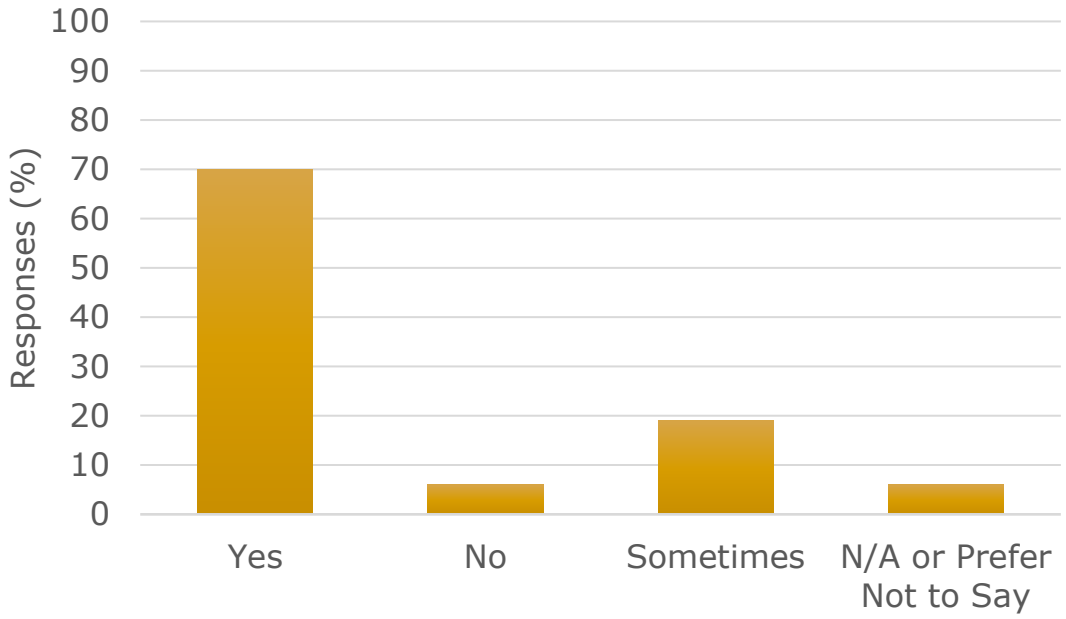
- Enhances glycolysis and fermentation rate
- Improves ethanol yield by keeping NADH/NAD^+ cycling efficient
- Supports yeast budding and reproduction
- Enzyme cofactor (100+)
- The effect of zinc is cumulative

Without adequate zinc, the enzymatic pathway bottlenecks, causing yeast to accumulate acetaldehyde and struggle to complete fermentation.

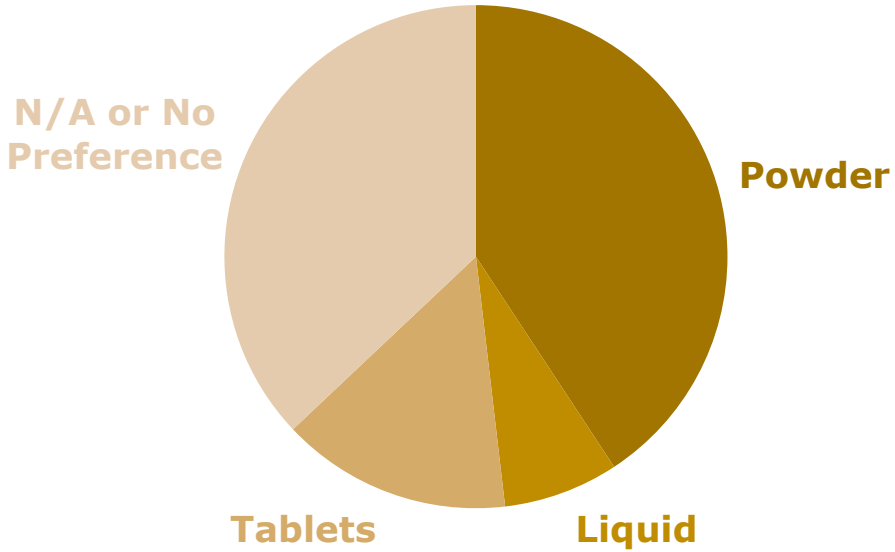
Image source: Wikimedia Commons, Pyruvate_decarb_1.jpg

2025 CBC Survey

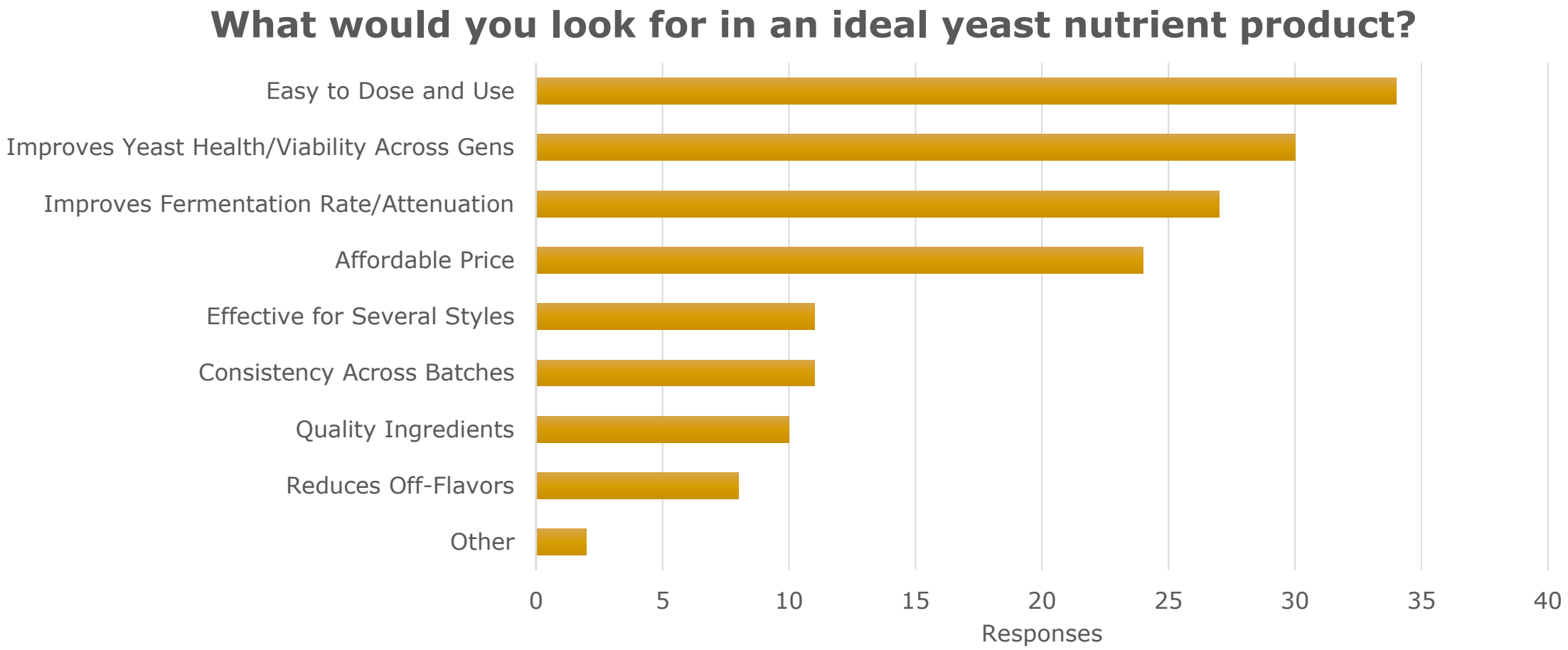
Do you currently use yeast nutrients?



Is there a nutrient format you prefer?



CBC Survey


What would you look for in an ideal yeast nutrient product?
Easy to Dose and Use
Improves Yeast Health/Viability Across Gens
Improves Fermentation Rate/Attenuation
Affordable Price
Effective for Several Styles
Consistency Across Batches
Quality Ingredients
Reduces Off-Flavors
Other
0
5
10
15
20
25
30
35
40
Responses

CBC Survey Takeaways

- Brewers overwhelmingly use brewing nutrients of some sort
- Brewers use nutrients when producing all styles of beer
- Powdered Nutrients was the most selected format, No Preference or N/A as the runner up
- Most important nutrient characteristics to brewers:
  - Easy to dose and use
  - Improves Yeast Health and Viability when serial re-pitching
  - Improves Fermentation Rate and Attenuation
  - That it is affordable



Yeast Nutrient Trial: The Nutrient

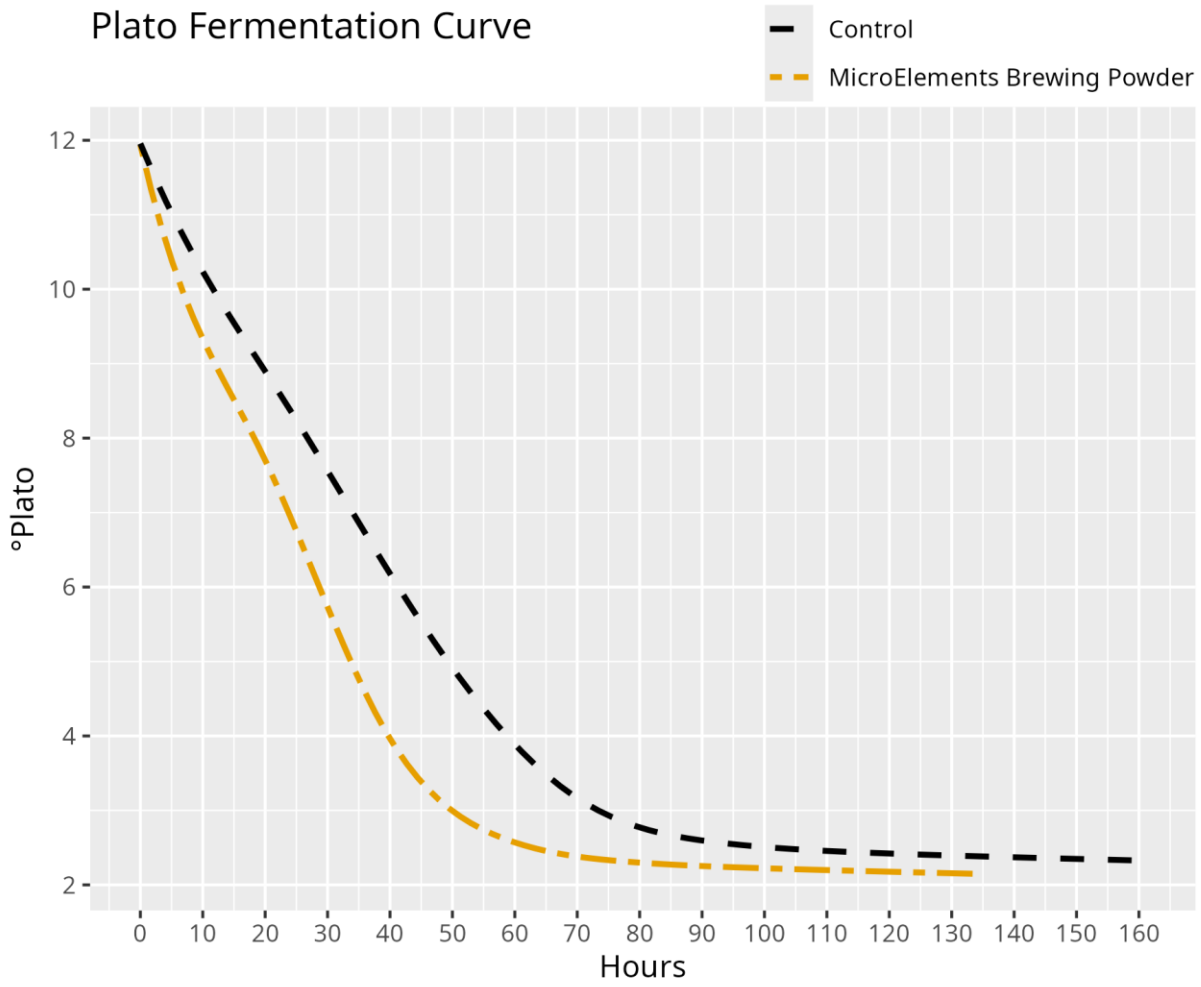
MicroElements® Brewing Nutrients are comprised of autolyzed yeast, zinc, calcium, manganese, magnesium, vitamins B3 and B5.

Zinc	▪ Arguably the most important trace mineral for fermentation efficiency and yeast health ▪ Typically deficient in wort because hot break and trub precipitate much of it
Nitrogen	▪ Free amino acids/peptides from autolyzed yeast are fundamental for yeast growth and vitality ▪ Autolyzed yeast also adds other components such as sterols, lipids, vitamins, minerals
Ca and Mg	▪ Calcium and magnesium act more indirectly, stabilizing enzymes, membranes, and flocculation
Manganese	▪ Protects yeast cell wall membranes from oxidative stress
Vitamins B3 and B5	▪ Vital for metabolic pathways and stress resistance

Summit Brewing Trial Parameters

Trial (ME Brew Powder)	Control (No Nutrient)
n=23: 23 Tank Fills, 60 Total Brews	**n=52:** 52 Tank Fills, 134 Total Brews
Nutrient: 3.3g/BBL	**Nutrient:** None
OG: 12°P	**OG:** 12°P
Total Yeast Gens: 11	**Total Yeast Gens:** 12 and 13
Recipe: Pale Ale (No DH)	**Recipe:** Pale Ale (No DH)
Measured Parameters: Ferm Time, FG, RDF%, ABV%, Pitch Viability	**Measured Parameters:** Ferm Time, FG, RDF%, ABV%, Pitch Viability

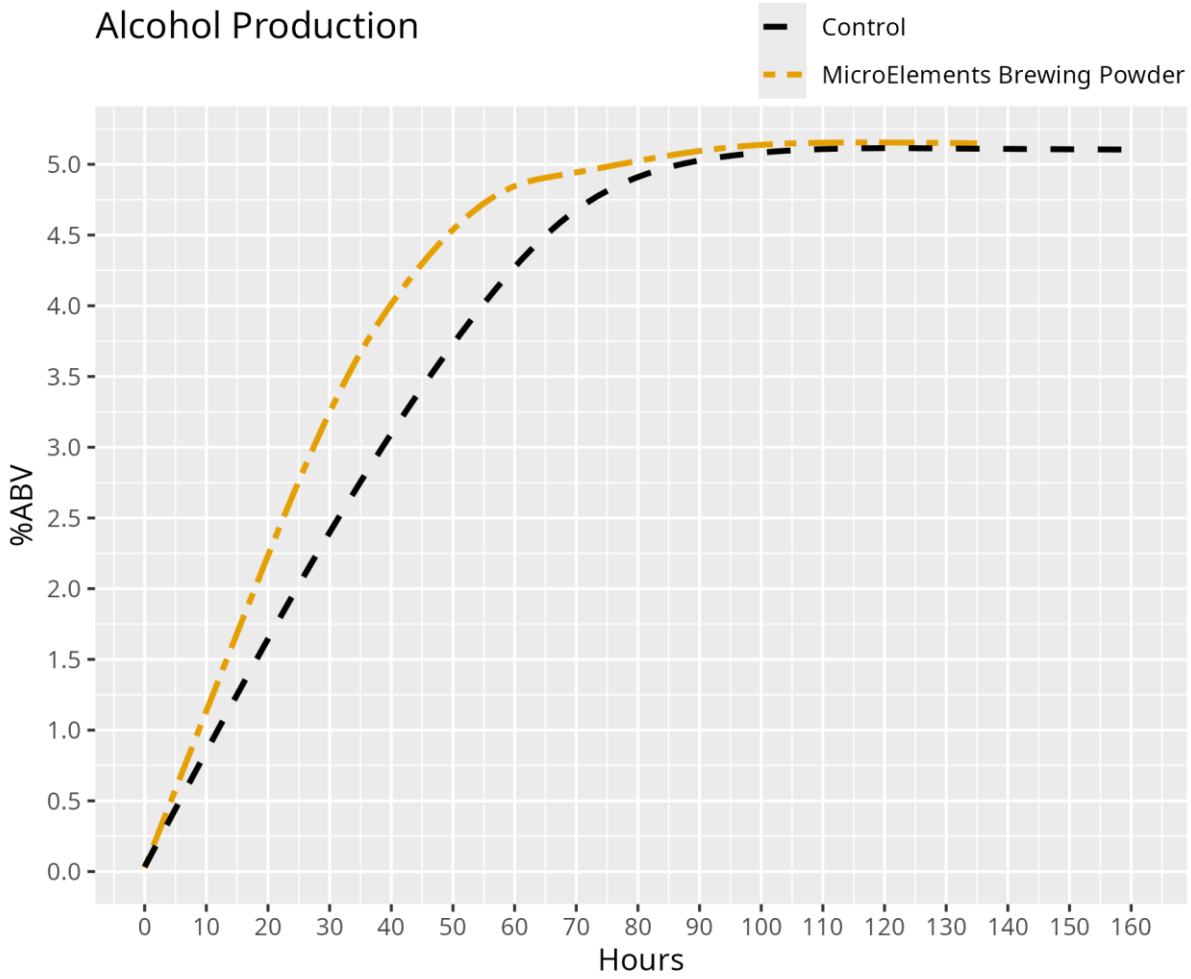
Summit Trial Results: Fermentation Time



Mean Fermentation Time

Group	Time (Hours)
Trial	104.6
Control	124.4
Difference	19.8
p <	0.0001

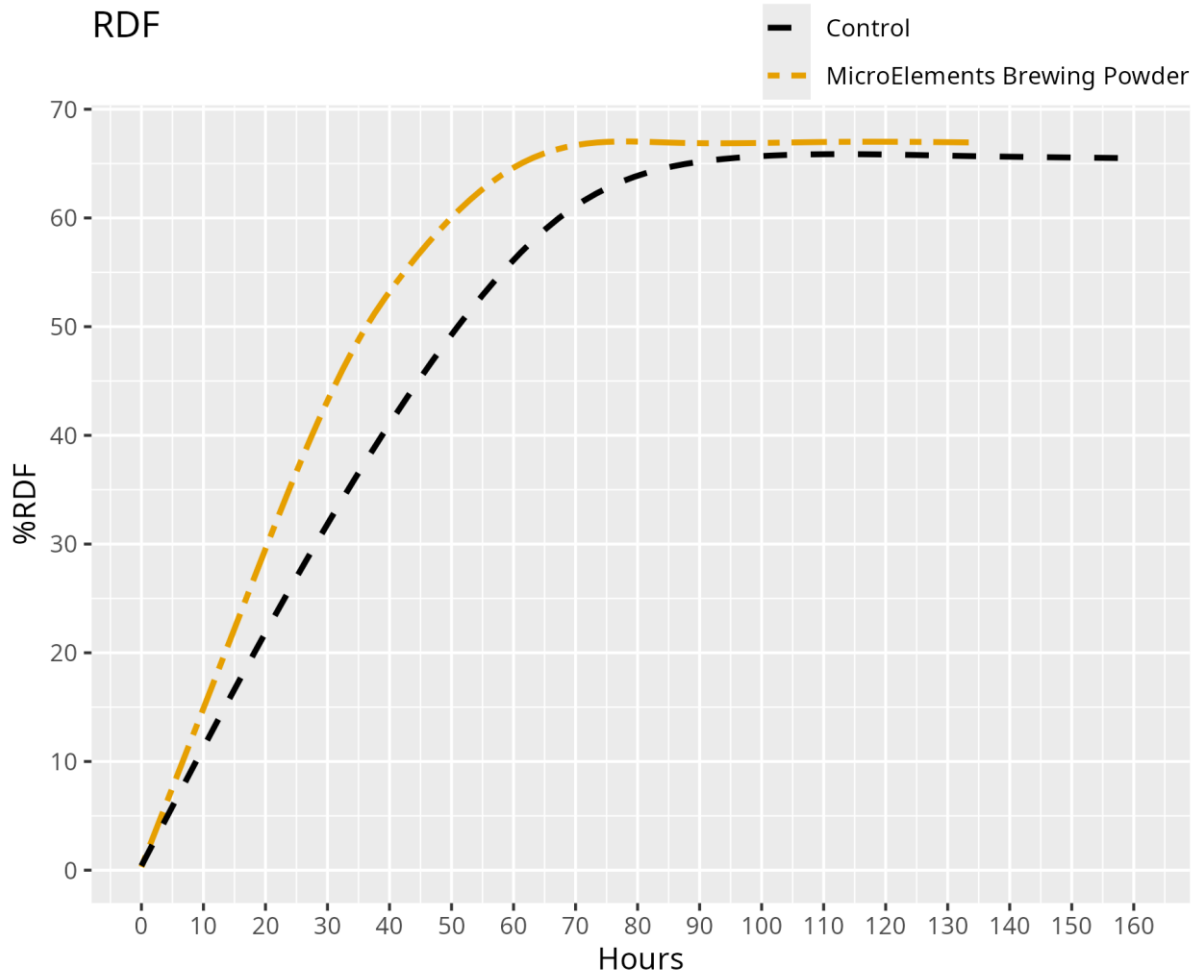
Summit Trial Results: Alcohol Production



Mean Alcohol Production

Group	ABV (%)
Trial	5.125
Control	5.118
Difference	0.007
p =	0.73

Summit Trial Results: Real Degree of Fermentation



Mean Real Degree of Fermentation

Group	RDF (%)
Trial	66.91
Control	65.94
Difference	0.97
p <	0.0001

Summit Trial Results: Yeast Viability

Mean Yeast Viability

Group	Viability (%)
Trial	87.0
Control	84.9
Difference	2.1
p =	0.55

Mean Yeast Viability Gen 9 - Final

Group	Viability (%)	SD
Trial (n=7)	88.3	7.9
Control 1 (n=10)	82.9	21.8
Control 2 (n=8)	88.0	19.0

Craft Lager Trial

Trial (n=3) and Control (n=1)

Nutrient: 3.3g/BBL vs Zinc @ 3ppm

OG: 12°P

Recipe: Lager

Measured Parameters: Ferm Time, FG, RDF%, ABV%

CCP: VDK (50ppm threshold)

Results (Trial vs Control)

Faster Fermentation Time
9.7 Days vs 12 Days

Faster VDK Reduction
8.7 Days vs 11 Days

Improved RDF%
63.2% vs 62.2%

Internal Competitive Trial

Trial

Setup: Benchtop, 3 Competitor Products, In Duplicate

Nutrient: 3.3g/BBL vs Manufacturer Recommended Dosage Rates

OG: 15.8°P

Recipe: IPA (No DH)

Measured Parameters: Ferm Time, RDF%, ABV%, YAN, Residual Sugar

Results

Faster Fermentation Time

Increased Ethanol Yield

Improved RDF%

Lower Residual Sugar

Lower Overall Dosage Rate

Trial Key Takeaways

Significantly Faster Ferm Times

Higher RDF%

Equivalent ABV%

Equivalent But More Consistent Yeast Viability

Faster VDK Reduction

MicroElements® BrewPOWDER NUTRIENTS

Lower Dosage Rate vs Competitors


Q&A

Thank You!

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Special thanks to Ivonne Dresser, Chris Nevosh, Daniel Gusmer & Summit Brewing