INITIAL DATA FROM 10 NON-SACCHAROMYCES FERMENTATIONS

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Initial results from the evaluation of 10 strains of non-Saccharomyces yeast purported to have the ability to create lactic acid during primary fermentation.

Recipe / Wort Parameters:

- 40 gallon single batch split 10 ways.
- Brewed March 7, 2017.
- Pre-fermentation gravity measured with refractometer.

Malts	Hops	Water	Mash	Boil
• Munton's Marris Otter (34.5%) • Briess 2-Row Brewer's Malt (34.5%) • Avanguard White Wheat Malt (17.2%) • Weyerman Munich II (10.3%) • Simpson's Golden Naked Oats (3.4%)	• Northern Brewer, 2 oz. at 60 min, 9.1 IBU. • Northern Brewer, 3 oz. at 30 min, 10.5 IBU • Estimated Total IBU = **19.6**	• R.O. water buffered with 1mL phosphoric acid per gallon. • 14 grams calcium sulfate and 21 grams calcium chloride added to mash during protein rest.	• 130° F - 10 min. • 150° F - 60 min. • 168° F - 10 min.	60 min. boil with 4 tablets of Whirlfloc added at 15 min.

Fermentation Parameters:

- Cell Count / Pitch Rate Not Controlled.
- Individual Carboy Temperatures Not Controlled, All carboys fermented in same area held at 72° F.
- Strains provided by Wild Pitch Yeast Labs. Propagation Dates: 1/30/17 to 2/3/17.
- All strains stored under refrigeration and pitched March 7, 2017. Data collected April 5, 2017.

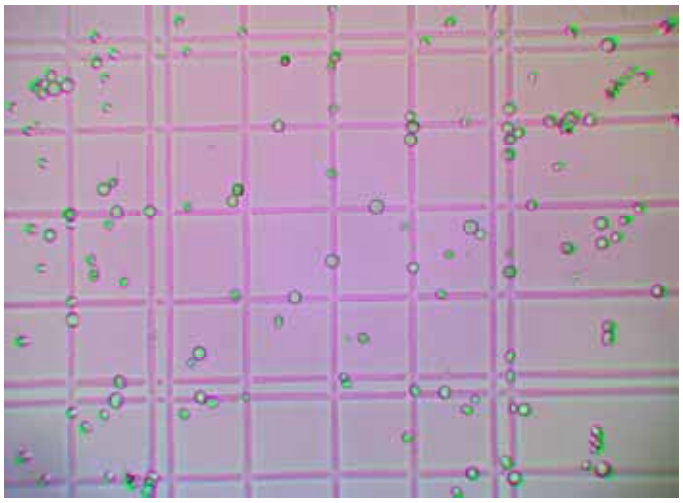
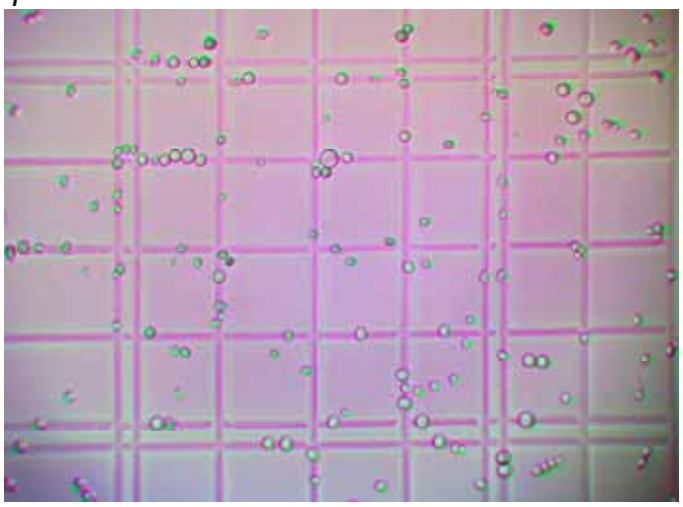
Results:

- Post-fermentation gravity measured with hydrometer.
- Wort and Beer pH measured with calibrated MW-102 pH Meter with ATC.

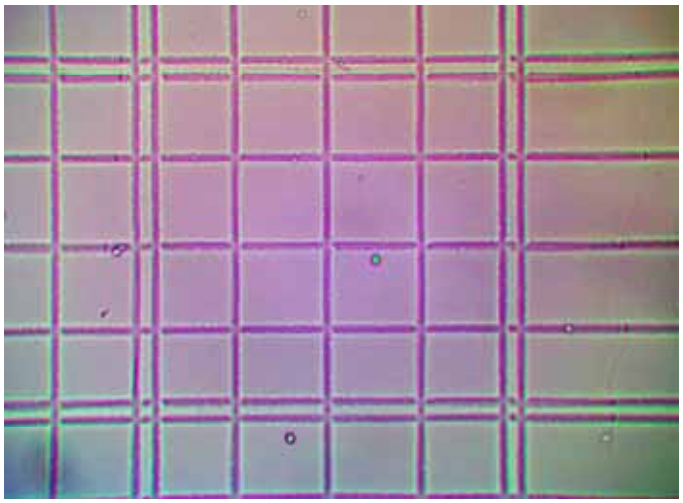
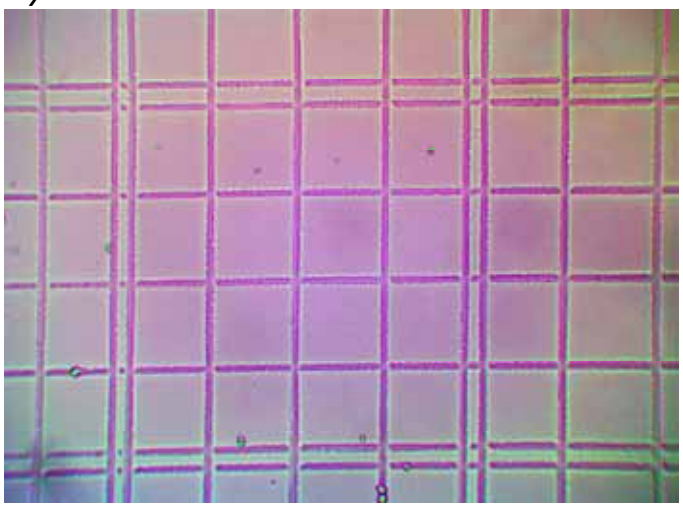
Strain	Species	Wort OG	Beer FG	Atten-uation	ABV	Wort Pre-Fermentation pH	Beer Post-Fermentation pH	Tasting Notes:	Appearance
YH25	*Lachancea fermentati*	1.044	1.006	85.9%	5.0%	5.45	4.26	Green apple, Cinnamon (Spiced Cider), Stonefruit, Lightest hint of acidity	Hazy
YH77	*Lachancea fermentati*	1.044	1.002	95.3%	5.5%	5.45	4.27	Green apple, some Cinnamon (less than YH25), White Grape Juice, Light Fruity Sweetness	Fairly Clear
YH58	*Hanseniaspora vineae*	1.044	1.004	90.6%	5.3%	5.45	4.39	Light Sulfur, Green Apple, Light Solvent, Like an Estery Lager	Fairly Clear
YH72	*Hanseniaspora vineae*	1.044	1.006	85.9%	5.0%	5.45	**3.79**	Peaches in Aroma, Light Spicy, Stonefruit, Distinct tartness balanced against peach-like fruity sweetness	Hazy
YH62	*Wickerhamomyces anomalus*	1.044	1.012	72.0%	4.2%	5.45	4.08	Vegetal aroma, lightly Medicinal, Phenolic.	Very Hazy
YH82	*Wickerhamomyces anomalus*	1.044	1.004	90.6%	5.3%	5.45	**3.80**	Light Sulfur, Stonefruit Plums, Light tartness against fairly clean malt background	Crystal Clear
YH109	*Lachancea thermotolerans*	1.044	1.008	81.3%	4.7%	5.45	**3.86**	White Grape, Apple, Light Spice, Thin Body	Very Hazy
YH140	*Lachancea thermotolerans*	1.044	1.010	76.6%	4.5%	5.45	4.05	Green Apple, Light Spice, Light Peach & Pear, Slickness in Mouthfeel	Very Hazy
YH156	*Schizosaccharomyces japonicus*	1.044	1.000	**100.0%**	5.8%	5.45	4.52	Sulfur like a warm ferment lager, lightly Spicy.	Fairly Clear
YH157	*Schizosaccharomyces japonicus*	1.044	1.000	**100.0%**	5.8%	5.45	4.58	Less sulfur than YH156, Plain-Jane.	Fairly Clear

All samples that achieved a pH under 4.0 were reviewed under microscope to look for overt signs of lactic acid bacterial contamination. No overt signs of such contamination were found.

YH72 - *Hanseniaspora vineae*

YH82 - Wickerhamomyces anomalus

YH109 - *Lachancea thermotolerans*