

Levulia Alcomeno (AEB) Yeast Trial on Cabernet Franc
Rosemont Vineyards and Winery
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Summary

This study examines the impact of Levulia Alcomeno (*K. thermotolerans*) yeast inoculation followed by inoculation with FX-10 after 4 days versus inoculating with FX-10 alone on Cabernet Franc wine. *K. thermotolerans* is a yeast species which often produces wine of higher acidity and lower ethanol. Although the Levulia Alcomeno fermentation had a longer lag phase, they both finished fermentation around the same time. Wine fermented with Levulia Alcomeno showed slightly increased TA, lactic acid, and decreased pH and ethanol, which is consistent with *K. thermotolerans* fermentation profiles. The decrease in pH corresponds to a 23% increase in proton concentration. Additionally, this wine showed less acetaldehyde and more isoamyl alcohol. These results suggest that Levulia Alcomeno, while potentially affecting the chemical makeup of wine, did not have a strong impact on the sensory qualities of wine. It may have slightly increased Fruit Intensity and decreased Astringency, but if so this was a weak trend. This yeast shows promise, however, and more studies are warranted to determine whether this yeast can reproducibly produce these effects, and whether these effects are enhanced based on different starting fruit chemistry. At this point, no firm conclusions can be drawn.

Introduction

Wines made in certain regions in Southern Virginia can have a tendency to develop very high alcohol and high pH. As a result, natural mechanisms for reducing the ethanol and the pH should be sought. One such natural possibility is the use of *Kluyveromyces thermotolerans* yeast strains for the first part of fermentation. These yeast strains often result in lower ethanol and higher lactic acid, thus increasing titratable acidity and decreasing pH (AEB 2017). This study examines the impact of a strain of this yeast, Levulia Alcomeno (AEB), on the finished wine.

Results and Discussion

Although the Levulia Alcomeno fermentation had a longer lag phase, they both finished fermentation around the same time. Wine fermented with Levulia Alcomeno showed slightly increased TA, lactic acid, and decreased pH and ethanol, which is consistent with *K. thermotolerans* fermentation profiles. The decrease in pH corresponds to a 23% increase in proton concentration. Additionally, this wine showed less acetaldehyde and more isoamyl alcohol.

Juice Chemistry

	Brix	pH	TA (g/L)	YAN (mg N/L)
Juice Chemistry	22.6	3.86	7.1	169

Wine Chemistry

	Ethanol (%vol/vol)	Residual Sugar (g/L)	pH	TA (g/L)	Volatile Acidity (g/L)	Malic Acid (g/L)	Lactic Acid (g/L)	Total SO2 (ppm)	Free SO2 (ppm)
FX-10	13.30	1.1	3.91	5.13	0.40	<0.15	2.32	<10	<7
Levulia Alcomeno	13.13	1.0	3.82	5.45	0.39	<0.15	2.44	<10	<7
% Change	-1%	-9%	23%	6%	-3%		5%		

Lab Results from ICV from Early March, 2017

Higher Alcohols and Fusel Oils

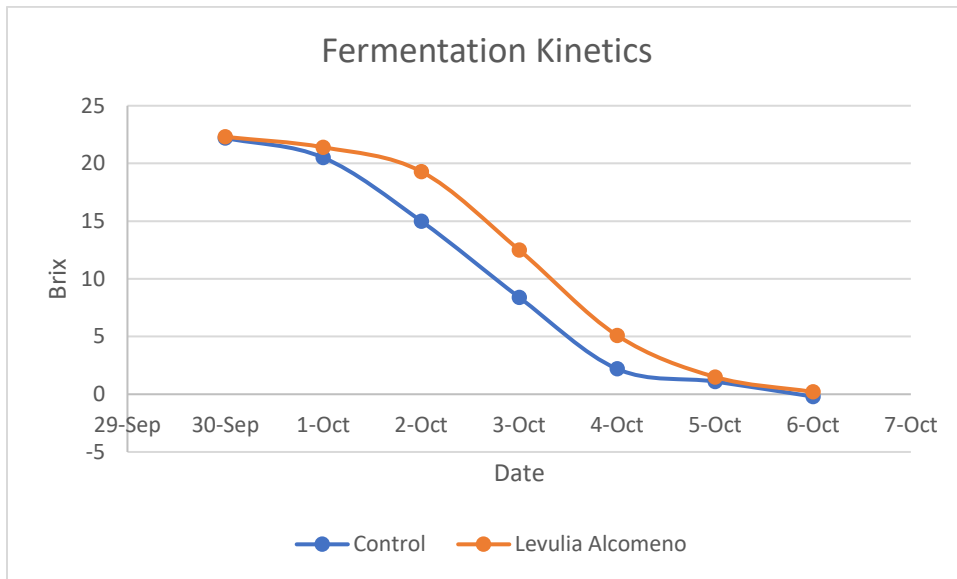
	Acetaldehyde (mg/L)	Ethyl Acetate (mg/L)	1-Propanol (mg/L)	Amyl alcohol (mg/L)	Isoamyl alcohol (mg/L)	Isobutanol (mg/L)	Methanol (mg/L)
FX-10	12	83	34	62	277	58	218
Levulia Alcomeno	8	79	34	62	298	58	212
% Change	-33%	-5%	0%	0%	8%	0%	-3%

Lab Results from ETS from Early March, 2017

Color Profile

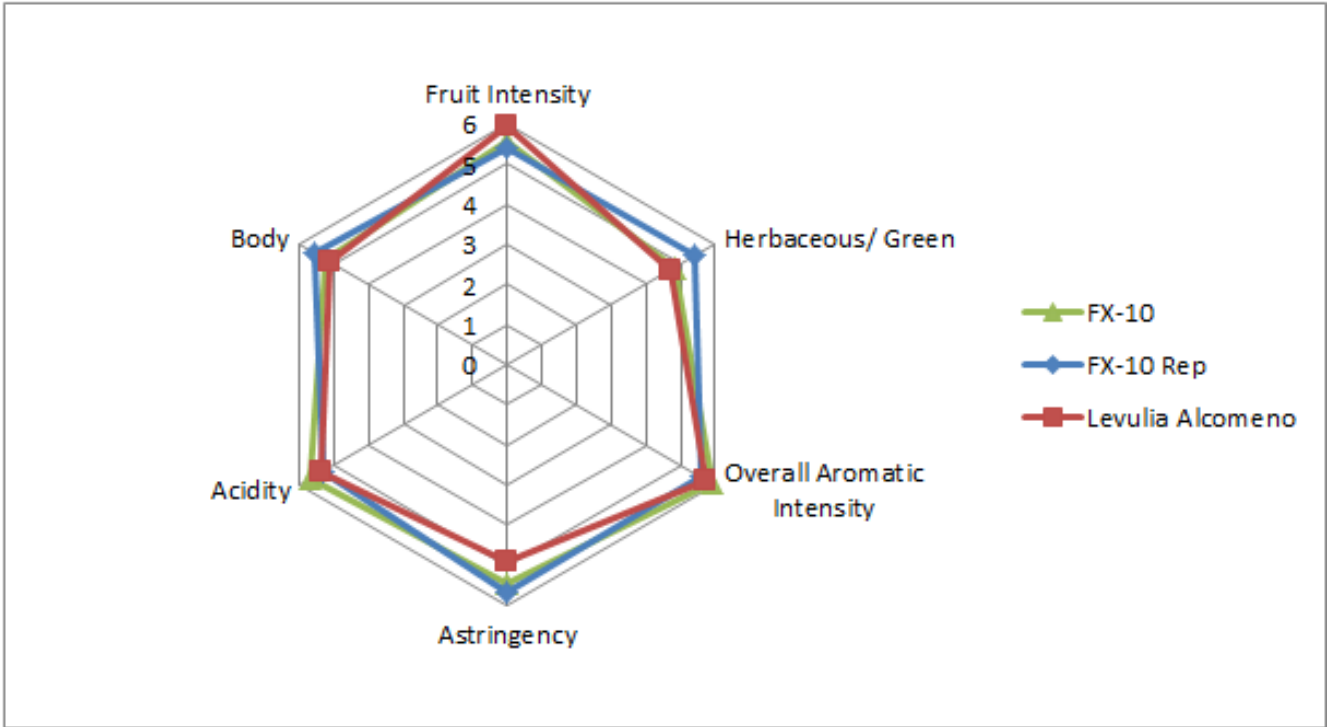
	A420	A520	A620	Hue (420/520)	Intensity (420 + 520)	Intensity (420 + 520 + 620)
FX-10	0.217	0.273	0.067	0.795	0.490	0.557
Levulia Alcomeno	0.218	0.282	0.067	0.773	0.500	0.567

Lab Results from ETS from Early March, 2017

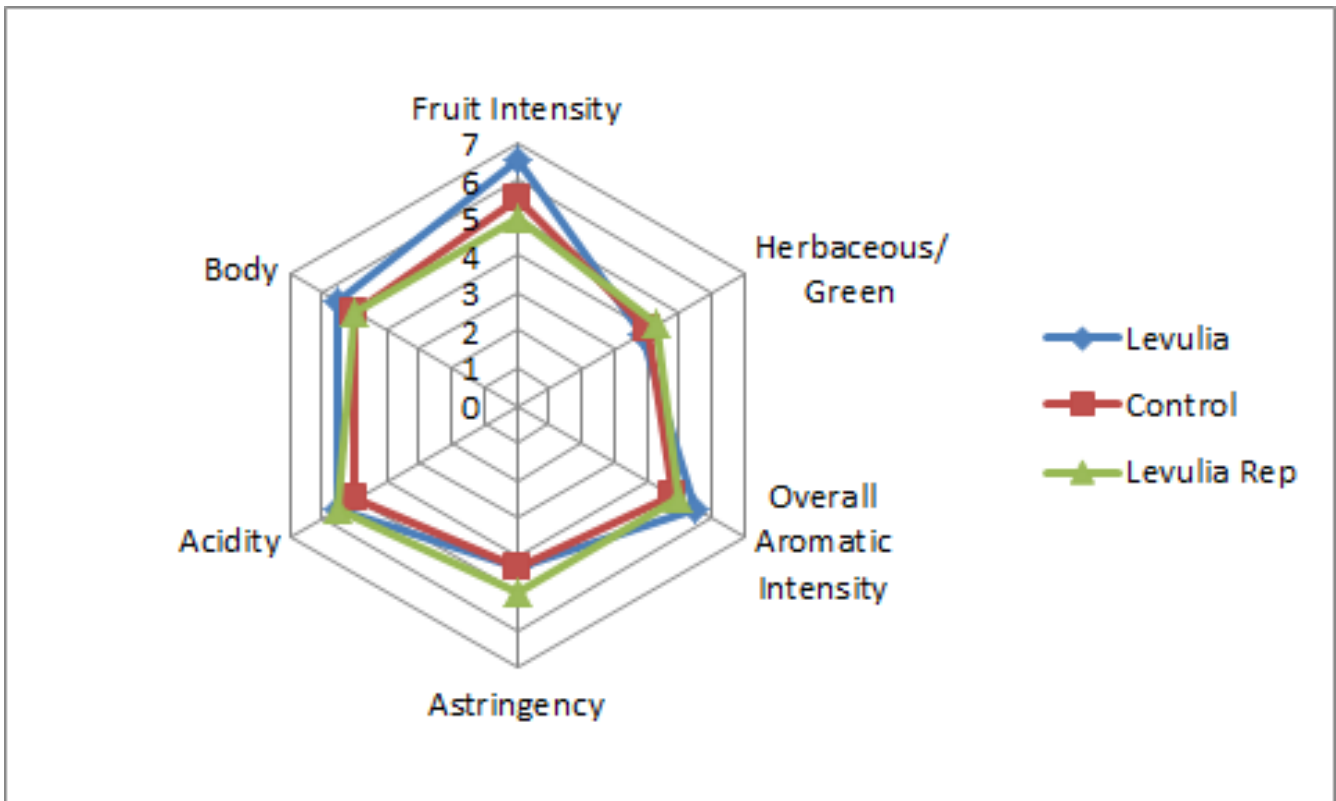


For the triangle test on the March 15 tasting, of 31 people who answered, 15 people chose the correct wine (48%), suggesting that these wines were not significantly different. However, this was very close to being significant. These wines were voted to have an average degree difference of 3.8 (out of 10), suggesting that the wines were not very different. In general, of people who correctly identified the wines, no major preference trends could be seen. No major trends could be seen with the descriptors used in this study. Levulia Alcomeno had a slight tendency to reduce Herbaceous/Green qualities, Astringency, and Body, and increase Fruit Intensity. These trends were weak, however.

	FX-10	Levulia Alcomeno	No Preference	Total Votes
Preferred	36%	43%	21%	14



For the triangle test on May 17, of 7 people who answered, 1 person chose the correct wine (14%), suggesting that the wines were not significantly different. No strong trends were found on the May 17 tasting with the descriptors used in this study.



These results suggest that *Levulia Alcomeno*, while potentially affecting the chemical makeup of wine, did not have a strong impact on the sensory qualities of wine. It may have slightly increased Fruit Intensity and decreased Astringency, but if so this was a weak trend. This yeast shows promise, however, and more studies are warranted to determine whether this yeast can reproducibly produce these effects, and whether these effects are enhanced based on different starting fruit chemistry. No firm conclusions can be drawn at this point.

Methods

Identically sourced Cabernet Franc grapes (13 year old clone 214 on 3309) were hand picked on 9/21, then destemmed and crushed on 9/22 into 1 ton fermenters. 30ppm sulfur dioxide, 30g/hL Tannin VR Supra, 2g/L untoasted French oak chips, and 40g/ton Lafase HE Grand Cru Enzyme were added at crush. The lower addition of sulfur dioxide was added to account for the non-*Saccharomyces* yeast.

During processing, cold soak and fermentation, trial and treatment received identical treatments except the trial T-Bin received 30 g / hL *Levulia Alcomeno* yeast while the control received FX-10 yeast at 25g/hL. Both treatments received 30g/hL Dynastart. 4 days into fermentation the *Levulia Alcomeno* treatment received 25g/hL FX-10 yeast. Both fermentations received 1g/L tartaric acid, 30g/L Thiozote, and 30g/hL Nutristart Org.

Punch downs were twice/day until 3 Brix, after which they were performed once per day until pressing. The trial and treatment wines were pressed separately on 10/12. Lactoenos 450 PREAC was added to wines for malolactic fermentation, which completed on 2/28/2017.

The wine was tasted on March 15 and again on May 17. Because the samples for the March 15 tasting were not sulfured, new samples which had been sulfured were used for the May 17 tasting. For the triangle test and preference analysis, anybody who did not answer the form were removed from consideration for both triangle, degree of difference, and preference. Additionally, anybody who answered the triangle test incorrectly were removed from consideration for degree of difference and preference. Additionally, any data points for preference which did not make sense (such as a person ranking a wine and its replicate at most and least preferred, when they correctly guessed the odd wine) were removed.

In order to balance the data set to perform statistical analysis for descriptive analysis on the March 15 tasting, any judge who had not fully completed the descriptive analysis ratings were removed. In order to then make the amount of judges between groups equivalent, one judge from group 1 and two judges from group 3 were transferred to group 2, and another judge from group 1 was eliminated. This resulted in a final data set of 3 groups, each with 9 judges (considered as replications within groups, and groups were considered as assessors). Data was analyzed using Panel Check V1.4.2. Because this is not a truly statistical set-up, any results which are found to be statistically significant ($p < 0.05$) will be denoted as a "strong trend" or a "strong tendency," as opposed to general trends or tendencies. The statistical significance here will ignore any other significant effects or interactions which may confound the results (such as a statistically significant interaction of Judge x Wine confounding a significant result from Wine alone). A three way, pseudo-mixed analysis of these interactions was not used to further verify whether the wine result was truly significant. The descriptors used in this study were Fruit Intensity, Herbaceous/Green, Overall Aromatic Intensity, Astringency, Acidity, and Body.

The same procedures for data analysis were used on the May 17 tasting. For the descriptive analysis in this tasting, each group had two judges (one judge had to be removed from Group 2), for a total of 6 judges.



References

AEB. 2017. Technical Data Sheet: Levulia Alcomeno.