

Bio-acidification of wines with *Lachancea thermotolerans*

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Pursuit of a bio-acidifying yeast

Lachancea thermotolerans (LT) can produce lactic acid from sugars during alcoholic fermentation. Our work elucidated the extent of genetic and phenotypic diversity of LT strains (Fig 1), whilst delivering a bio-acidifying starter to be used in co-cultures with *Saccharomyces cerevisiae* (SC).

Winemaking trial with overripe Merlot grapes

This study aimed to i) compare the chemical and sensory profiles of the bio-acidified LT and acid-adjusted SC wines, and ii) evaluate the use of LT wines in blends.

The grapes were fermented with a sequential culture of LT and SC at 48h (Zymaflore® OMEGA and SPARK, respectively), or an SC alone. Two aliquots of the SC wines were acidified with tartaric or lactic acid to reach the pH of the LT wine. The LT and SC wines were also blended in three proportions (Fig 2).

The wines underwent detailed chemical and sensory profiling (RATA; 30 experts, 46 attributes).

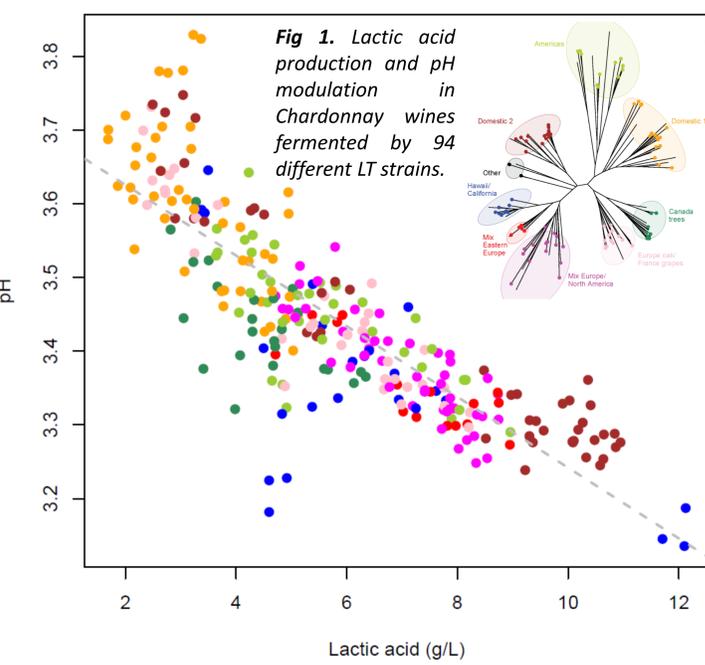
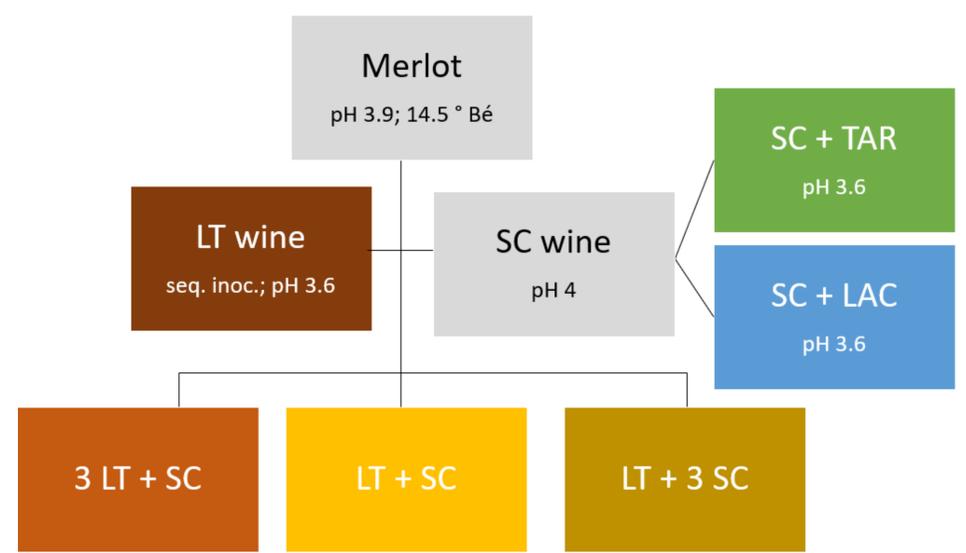


Fig 2. Schematic representation of the winemaking trial.



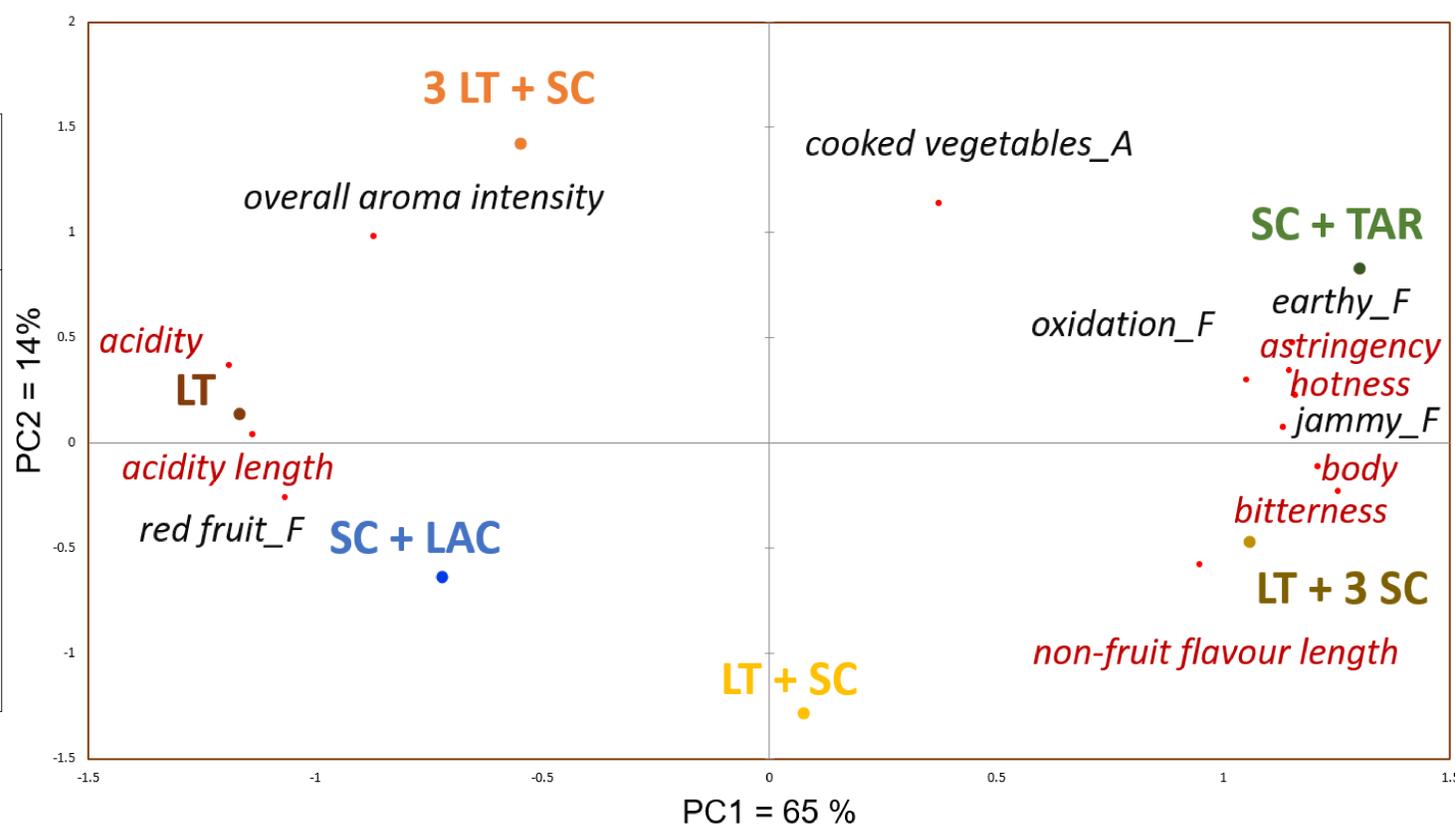
Modulation of chemical and sensory profiles of the wines

The LT wine had lower pH and ethanol content, and higher TA than the SC control (Table 1), driven by the production of >8 g/L of lactic acid. It was associated with an increased acidity perception and red fruit flavour (Fig 3). At the same pH (3.6), two acid-adjusted SC wines differed in their TA (higher in SC + LAC), and therefore acidity perception. This affected a range of sensory attributes, resulting in a 'fresher' SC + LAC wine profile, compared to the 'riper' SC + TAR wine style. The analytical and sensory profiles of the blends were modulated depending on the proportion of the bio-acidified wine.

Table 1. Oenological parameters of the wines (post-AF and without MLF)

Wine	pH	TA (g/L H2T)	Ethanol (%v/v)
SC	4.0	4.9	16.3
LT	3.6	9.4	15.4
SC + TAR	3.6	7.1	16.3
SC + LAC	3.6	9.3	16.3
3 LT + SC	3.7	9.1	15.6
LT + SC	3.8	7.1	15.8
LT + 3 SC	3.9	6.5	16.1

Fig 3. PCA of 13 sensory attributes that significantly differed (2-way ANOVA, $\alpha = 5\%$) between the wines.



Take-home message

The use of bio-acidifying LT strain(s) allows for modulation of wine acidity and ethanol levels without the use of external inputs. Such wines lend themselves for use as blending components to boost 'freshness' and differentiate styles.

