

Background

- The wine industry is **evolving**, the market is becoming more and more competitive on a global scale, so **new strategies** are being considered to **produce high-quality wine** like bringing a “regional signature” to their products.
- Using a locally isolated indigenous yeast could be helpful to achieve that **regional signature** and minimize **contamination risks**.
- Saccharomyces uvarum* as opposed to the traditionally used *S. cerevisiae* commercial yeast, tend to produce **more** glycerol (texture/sweetness), lactic acid, succinic acid, isobutanol (spirituous) and ethyl acetate (fruity) but **less** acetic acid (Volatile acidity), acetaldehyde (bruised apple), and ethanol. Specifically, *S. uvarum* **CN1** produces many **desirable volatile aroma** compounds (VOCs) such as 2-phenyl ethanol (rose) and ethyl isobutyrate (fruity).
- Recently, 6 indigenous *S. uvarum* (*CS-1 to 6*) strains have been isolated at a local winery in the Niagara region and are being characterized for fermentation.

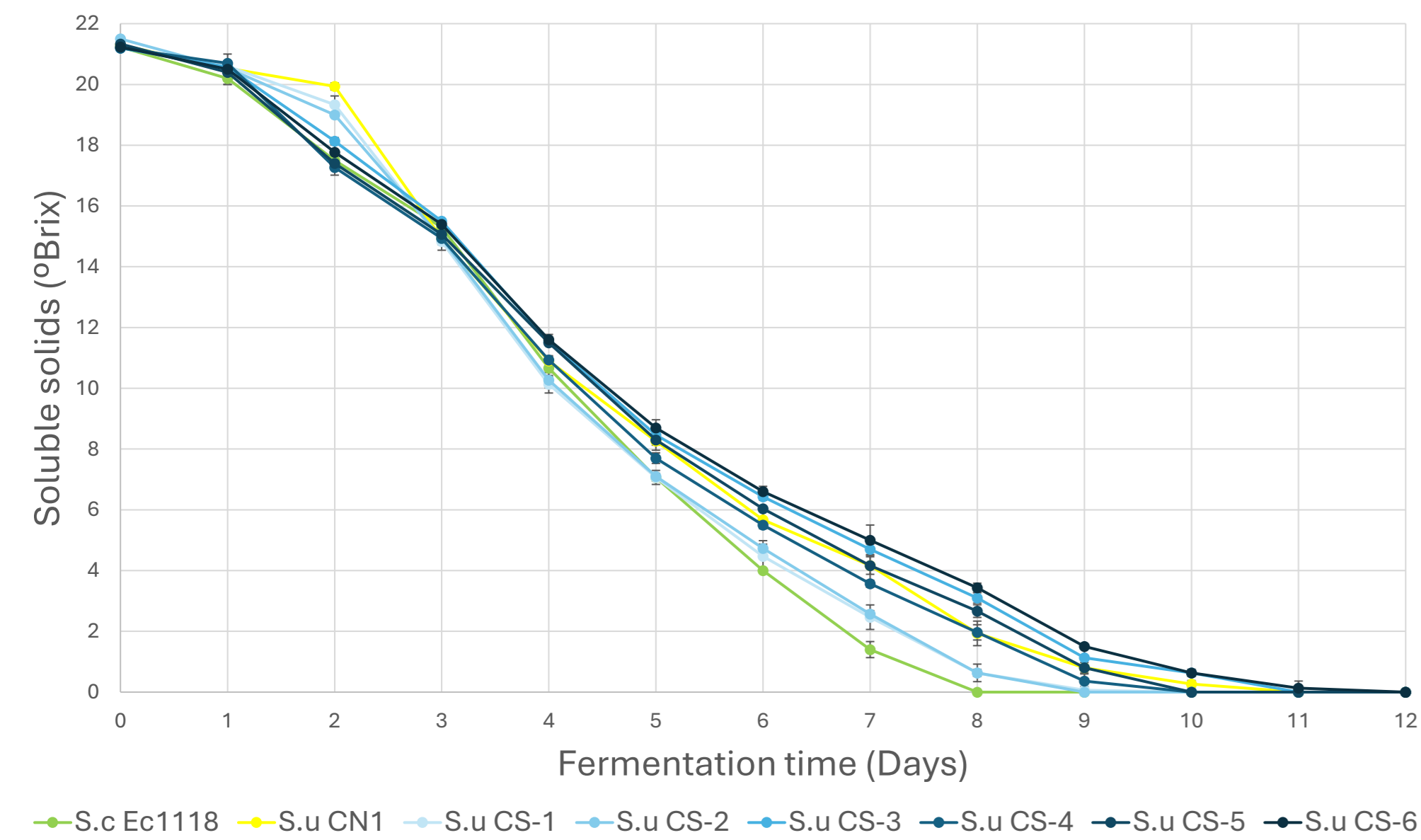
Objectives

Assess the fermentation ability, and ability of the yeast to produce volatile fatty acids and acetate esters for 7 locally isolated *Saccharomyces uvarum* isolates (CS 1-6 and CN1) in Chardonnay fermentation, determine if those yeasts can enhance the flavor profile of the wine and assess their capacity to be produce commercially.

Methods

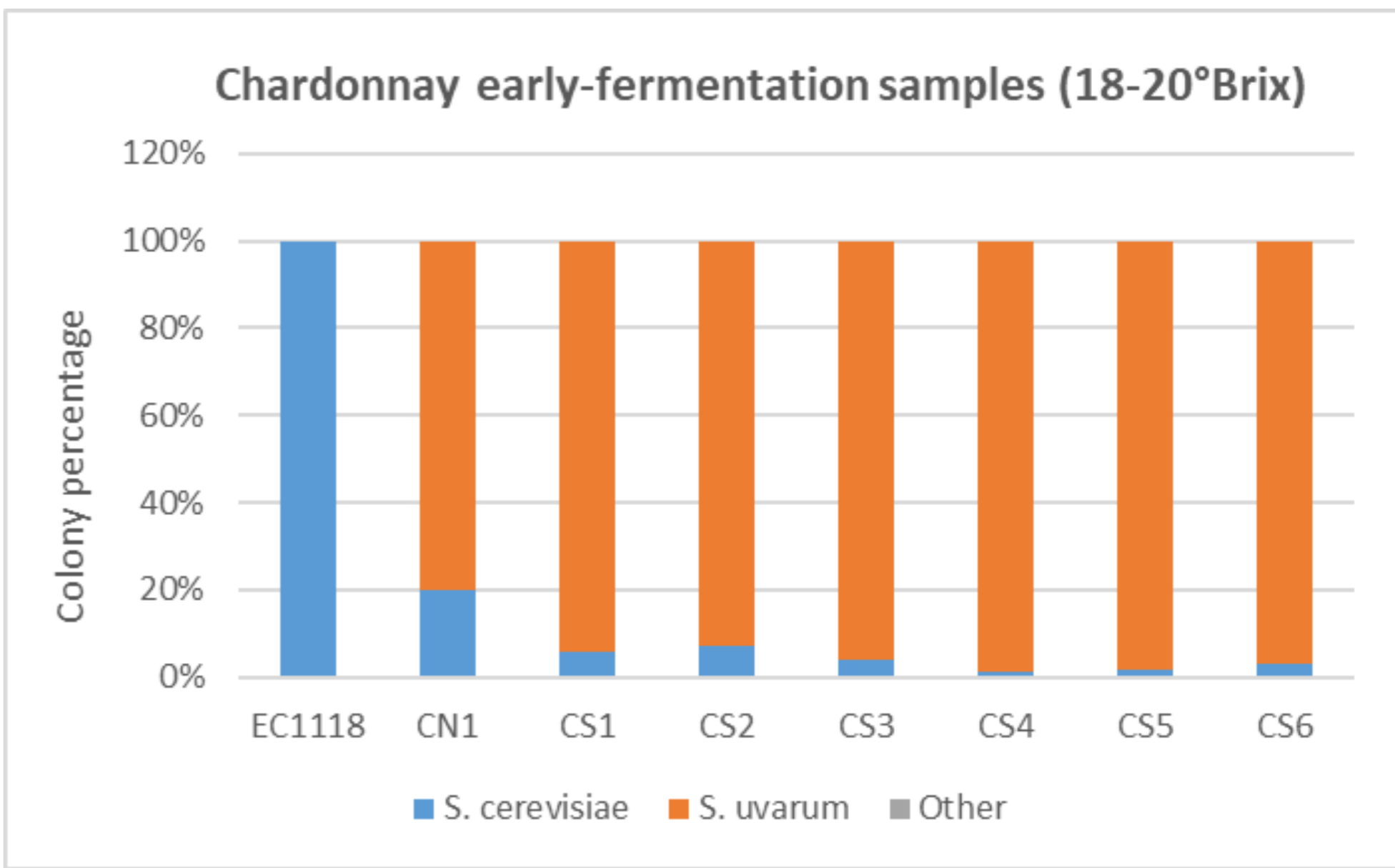
- Fermentation treatments were conducted in triplicate using commercial strain, *S. cerevisiae* EC1118 (control) and 7 locally isolated *S. uvarum* CN1, CS-1 to 6.
- Fermentations of 29.5L were held at 17°C and inoculated with yeasts at a concentration of 2x10⁶ cells/mL.
- Soluble solids and fermentation temperature were monitored throughout the fermentations; pH, TA, and ethanol were tested in the final wines, and acetic acid and glycerol were analyzed in both must and wine.
- Fermentation samples were plated on YPD and replicated on WLN media for implantation analysis.

Results



Metabolites in the final wine

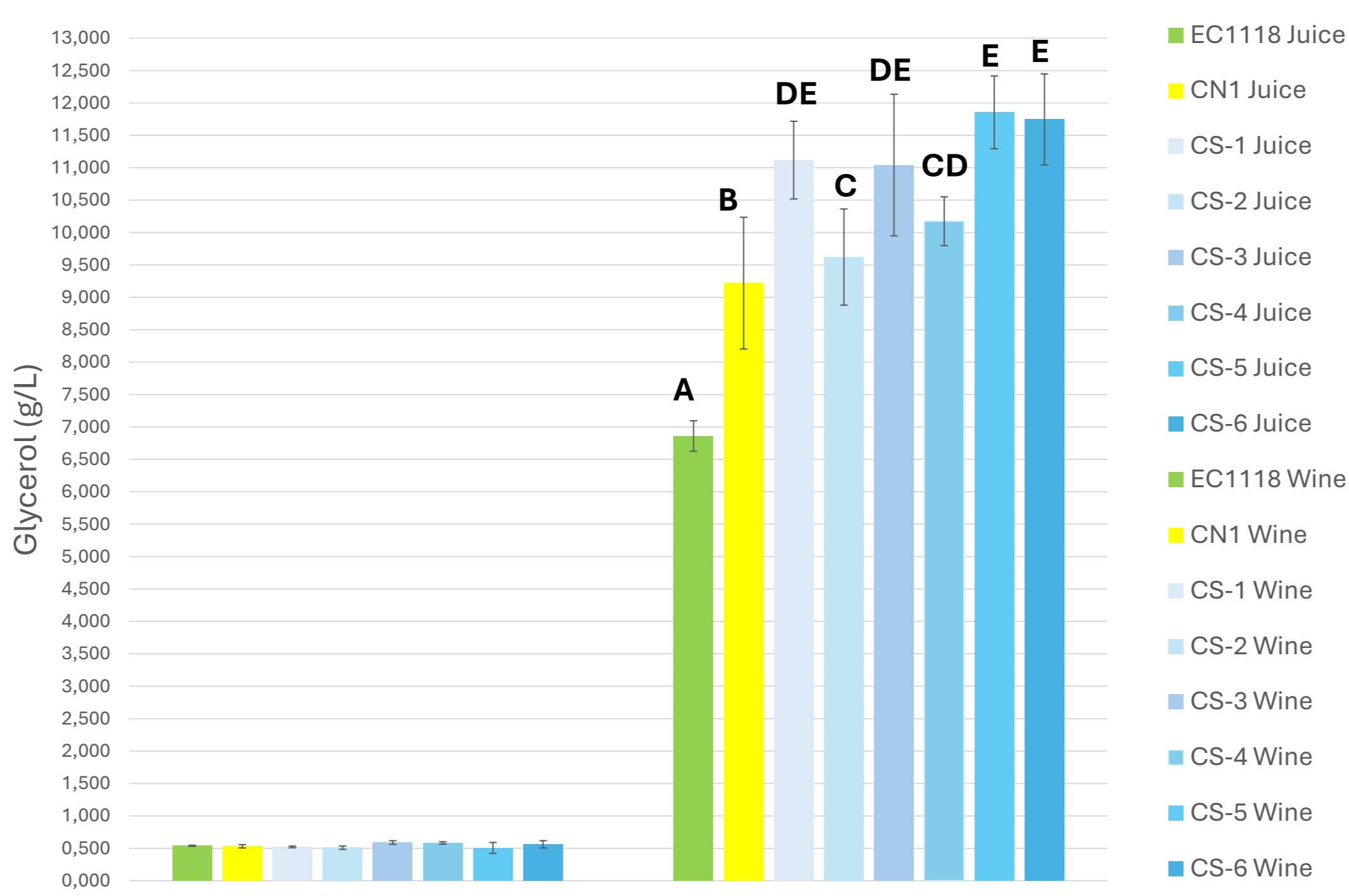
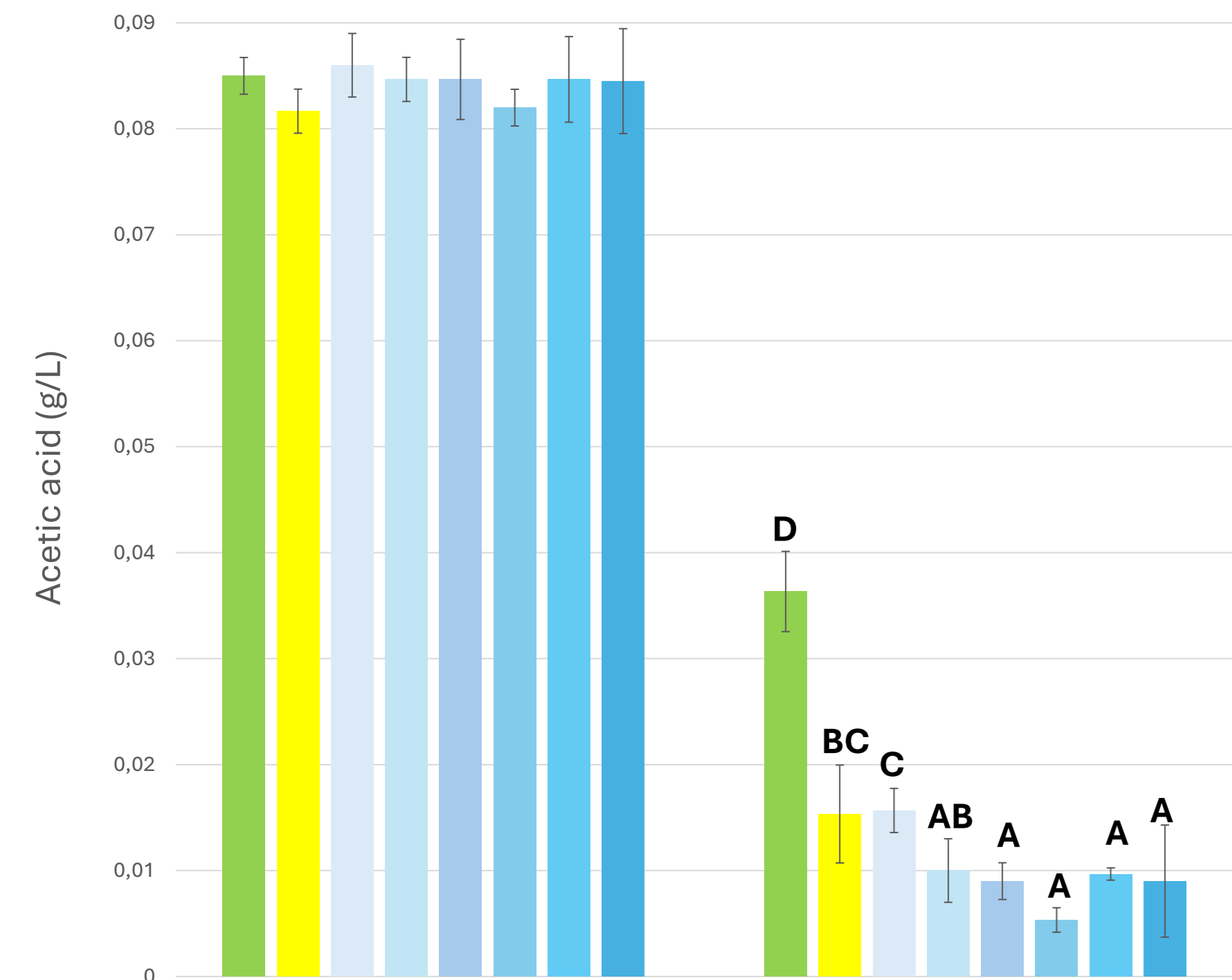
Strain	pH	TA	Ethanol (%)
EC1118	3,61 ± 0,02 AB	6,42 ± 0,15 A	12,9 ± 0,08 D
CN1	3,62 ± 0,02 BC	6,33 ± 0,26 A	12,2 ± 0,04 B
CS-1	3,60 ± 0,02 AB	6,38 ± 0,07 A	12,5 ± 0,01 C
CS-2	3,59 ± 0,01 A	6,53 ± 0,04 A	12,5 ± 0,02 C
CS-3	3,64 ± 0,01 C	6,47 ± 0,14 A	12,3 ± 0,13 BC
CS-4	3,61 ± 0,01 AB	6,54 ± 0,08 A	12,4 ± 0,11 BC
CS-5	3,61 ± 0,02 BC	7,01 ± 0,09 B	11,8 ± 0,38 A
CS-6	3,61 ± 0,01 AB	7,19 ± 0,22 B	11,7 ± 0,02 A



Interpretation:

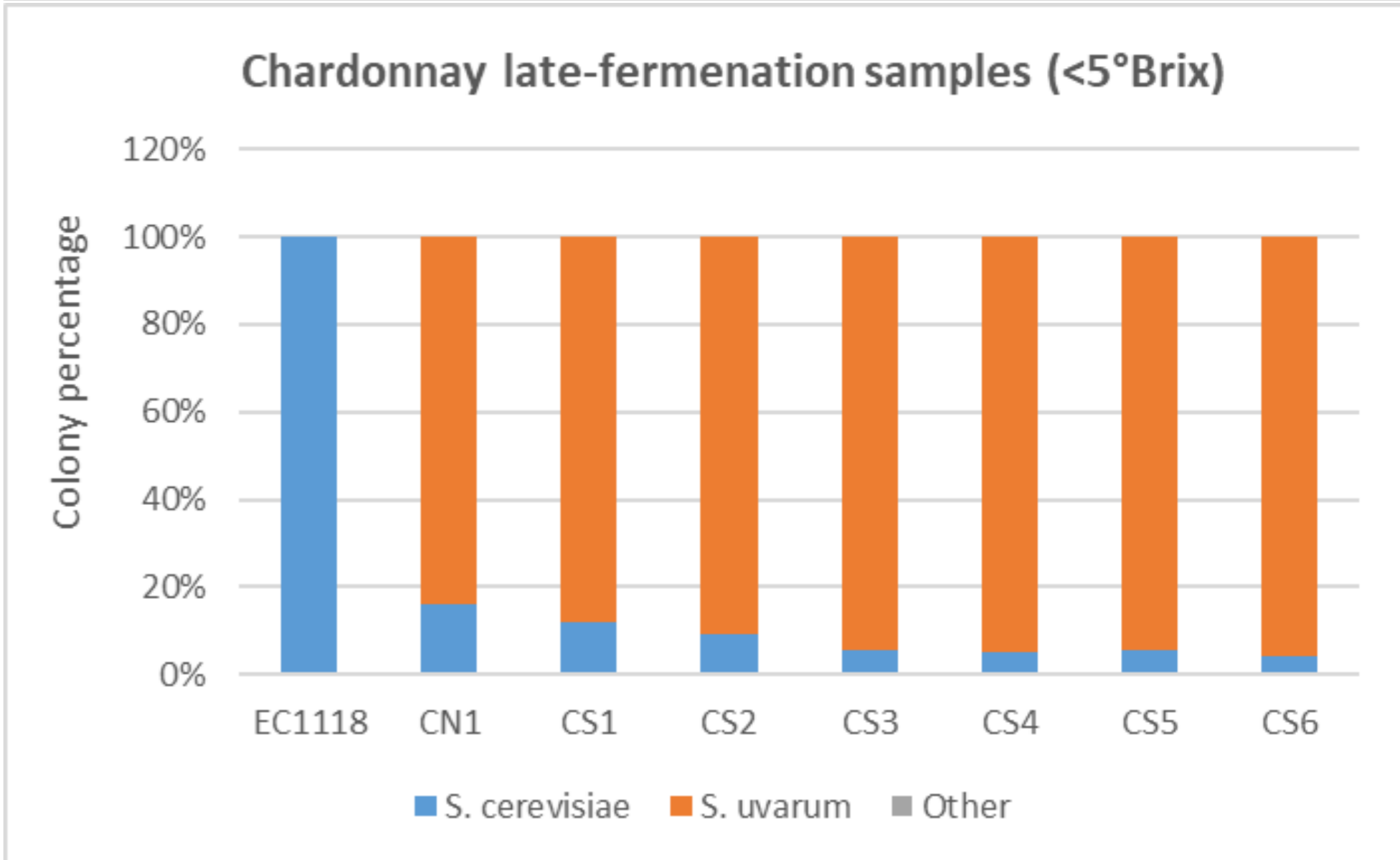
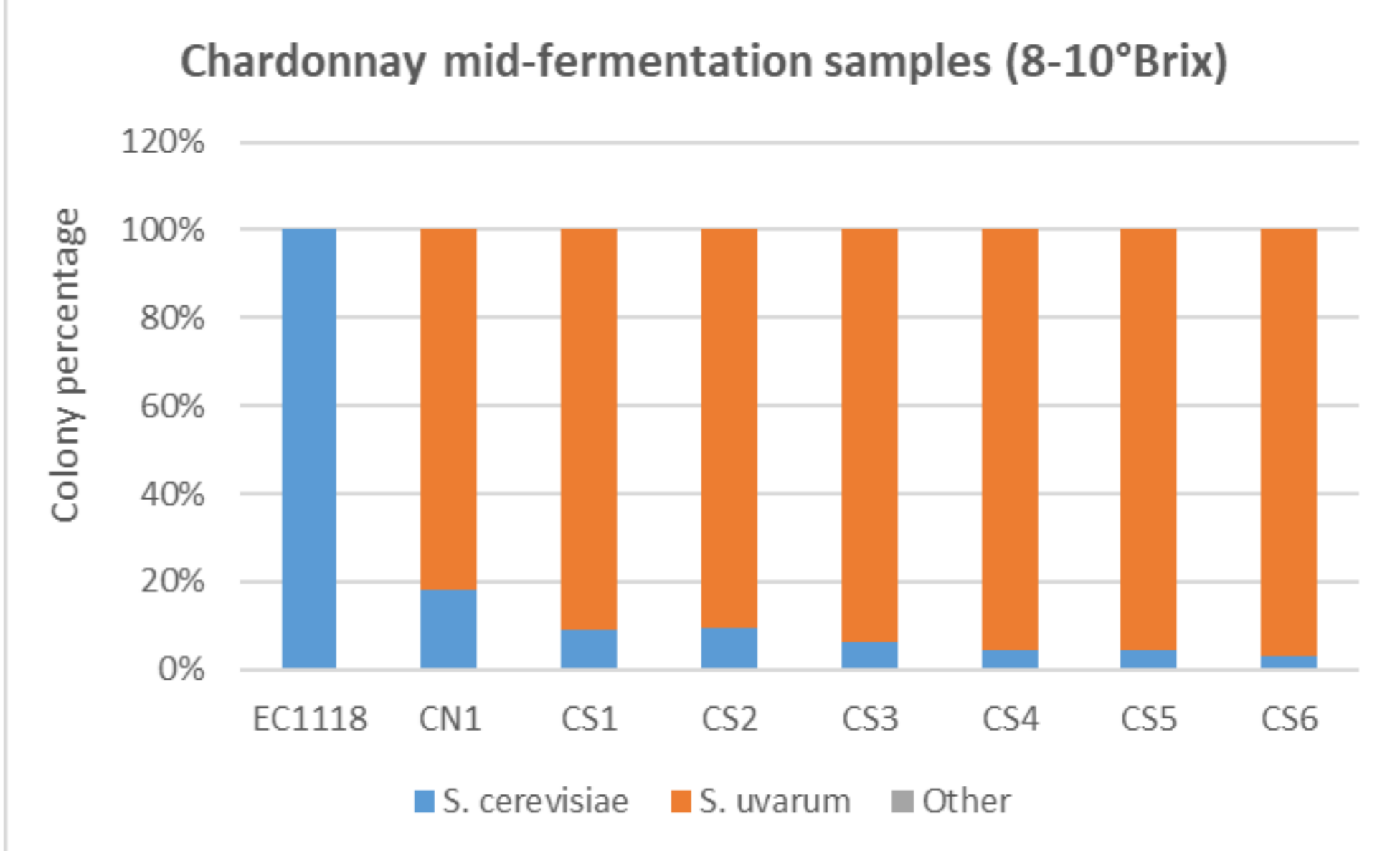
- All the local isolates (CN1 and CS-1 to 6) can **ferment to dryness** (< 0 °Brix) .
- All test strains produced significantly lower ethanol than EC1118 control. With CS-5 and CS-6 producing 1% less ethanol.
- EC1118 reach the dryness in 8 days, followed by SC-1 and 2 in 9 days and the other one between 10-12 days.
- CS-5 and CS-6 produced higher tartaric acid (TA) than the other strains.

Note: Temperature stayed between 16.7 °C and 17.5 °C.



Interpretation:

- Wine produced with *S. uvarum* (CN1, CS-1 to 6) show a significantly **lower concentration of acetic acid**, but a significantly **higher concentration of glycerol** compared to the control (EC1118).
- Those results confirm what has been observed in previous CCOVI research projects and in the literature.



Interpretation: All local isolates **successfully implanted** and dominated the ferments through to the late-stage.

Conclusion

- All the *S. uvarum* strains isolate (CN1, CS-1 to 6) **ferment to dryness** and **dominate the fermentation** at the early (20 Brix) , mid (10 Brix) and late (<5 Brix) stage of the fermentation.
- All the *S. uvarum* strains isolate (CN1, CS-1 to 6) show **significative differences in acetic acid, glycerol and ethanol production** compared to the control (EC1118).

Future of this project:

- More analysis must be done on the juice and wine, e.g. Nitrogen, Gluconic acid and VOCs to fully understand the impact that these new yeasts have on the wine.
- Large-scale chardonnay fermentation (1500L) will be done next years to assess if/how the scale-up impacts the different yeast fermentation capacities and the sensory profile of the wines.