2023

HARVEST SPOTLIGHT

Bacteria

Anchor OENOLOGY

ANCHOR BACTERIA PORTFOLIO

Oenococcus oeni and
Lactobacillus plantarum

Enhanced aroma profile in high pH red wines during malolactic fermentation.

APPLICATION

Red wine

SENSORY ATTRIBUTES

More fruit intensity
More red berry aroma characteristics
Enhanced spicy notes
Enhanced aroma intensity

TECHNICAL PARAMETERS

pH: ≥ 3.4
Potential alcohol tolerance: 15.5%
Temperature range: 18 - 28 °C
Total SO_2 inoculation:
40 - 50 ppm
No biogenic amine production
Little to no VA production

CO-INOCULATION

Oenococcus oeni and
Lactobacillus plantarum

Enhanced volume, mouthfeel and sensory profile in white and red wines during malolactic fermentation.

APPLICATION

Red and white wine

SENSORY ATTRIBUTES

Enhanced mouthfeel
Decrease in green characters
Reduced astringency
Enhanced dark fruit aromas

TECHNICAL PARAMETERS

pH: ≥ 3.2
Potential alcohol tolerance: 15%
Temperature range: 15 - 28 °C
Total SO_2 inoculation:
50 ppm
No biogenic amine production
Little to no VA production

CO-INOCULATION

Oenococcus oeni and
Lactobacillus plantarum

Enhanced dark fruit characters in red wines during malolactic fermentation and ageing (PDMS production).

APPLICATION

Red wine

SENSORY ATTRIBUTES

Increased plum & dark berry aromas
Hints of spice, black pepper & floral notes
Increased blackberry & blackcurrant notes:
DMS release during ageing

TECHNICAL PARAMETERS

pH: ≥ 3.3
Potential alcohol tolerance: 16%
Temperature range: 18 - 28 °C
Total SO_2 inoculation:
50 ppm
No biogenic amine production
Little to no VA production

CO-INOCULATION

Strain: AWRI YV Select
Oenococcus oeni

Enhanced complexity in red wines during malolactic fermentation.

APPLICATION

Red wine

SENSORY ATTRIBUTES

Enhanced structure
Increase in spice characters
More complexity
Darker fruit aromas

TECHNICAL PARAMETERS

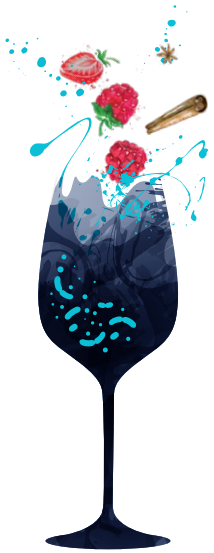
pH: ≥ 3.2
Potential alcohol tolerance: 16%
Temperature range: ≥ 14° C
Total SO_2 at inoculation:
50 ppm
No biogenic amine production
Little to no VA production
Fast fermentation kinetics

SEQUENTIAL INOCULATION

DUET RANGE

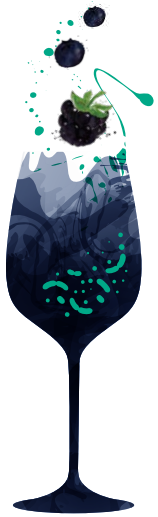
This Duet range is the home of the familiar and well-known *Oenococcus oeni/ Lactobacillus plantarum* bacteria blends in the Anchor portfolio, specifically developed for co-inoculation (a duet of alcoholic and malolactic fermentations).

The Duet Arom, Soft and Mature bacteria blends are focused on enhancing the quality, aroma and sensory perception of red, white and rosé wines during malolactic fermentation.



DUET AROM

Fruit & spicy notes



DUET SOFT

Softness & mouthfeel

DUET MATURE

Dark fruit notes

Wine quality and aroma during MLF

DUET AROM | DUET SOFT

WHY A BLEND OF BACTERIA?

- ✓ Security
- ✓ Co-inoculation benefits
- ✓ Impact on volatile acidity and diacetyl production
- ✓ Sensory benefits
- ✓ Impact on colour
- ✓ Bio-protection

Security

A blend of a robust *O. oeni* strain with *L. plantarum*, allow for the bacteria culture to perform MLF under a wide range of fermentation conditions, including pH and sulphur challenges.

Co-inoculation benefits

Addition at the same time as yeast:

TECHNOLOGICAL ADVANTAGES	MICROBIAL ADVANTAGES	SENSORY IMPACT
• Shorter total fermentation duration. • More efficient MLF in difficult wines. • Favourable fermentation heat. • No MLF nutrients required. • Reduced SO_2 usage required.	• Less inhibitory environment (fatty acids and ethanol from yeast). • Reduced risk of microbial spoilage. • Lower VA concentrations.	• Access to glycoside precursors. • Higher total esters and fruitiness. • Less diacetyl and butter characters. • More complex, integrated wines.

Impact on volatile acidity and diacetyl production

Whilst the heterofermentative *O. oeni* strain is able to produce volatile acidity, the *O. oeni* strains present in the Duet range are selected as low VA producing strains. The homofermentative *L. plantarum* strains are unable to produce any volatile acidity, even in the presence of high sugar concentrations in must during co-inoculation.

In co-inoculation conditions: A high sugar concentration results in less excess pyruvate and the bacteria prefers malic acid to citric acid in order to regenerate NAD^+. This results in the production of less diacetyl that could potentially mask complex aromas and promote wine oxidation.

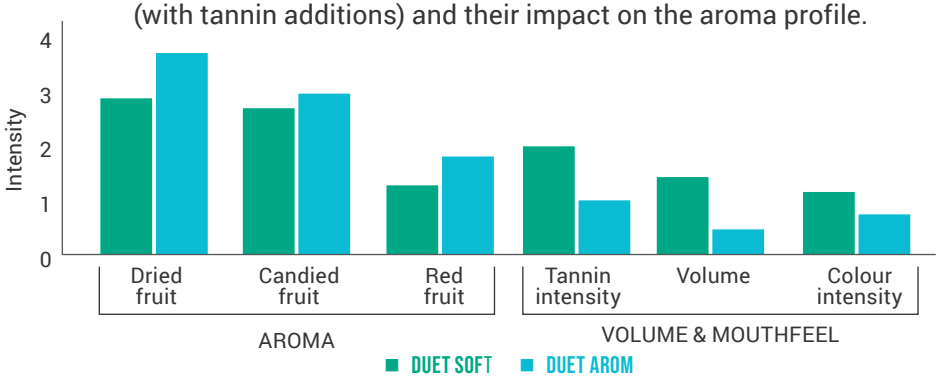
Sensory benefits

The blend allows for the more complex aroma contribution via the sensory-enhancing benefits of the *L. plantarum* bacteria species. This is due to the more complex enzymatic profile of the *L. plantarum* strain.

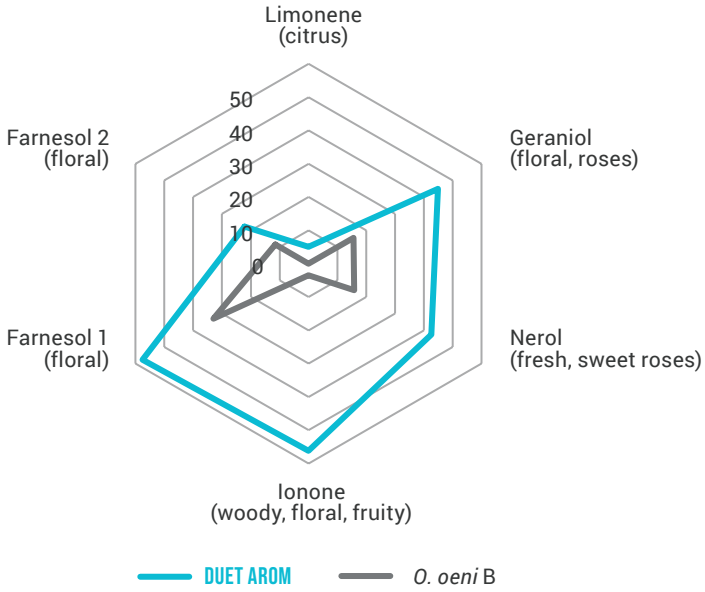
ENZYME	*L. PLANTARUM*	*O. OENI*	SIGNIFICANCE
Malolactic enzyme	+	+	Convert malic to lactic acid
β-D-glucosidase	+	-	Release bound precursors
Proline iminopeptidase	+	-	Release amino acid precursors
Esterase	+	+	Synthesis or hydrolysis of esters

The Duet range is developed to enhance the overall wine quality and the different blends have different sensory impacts in the wine.

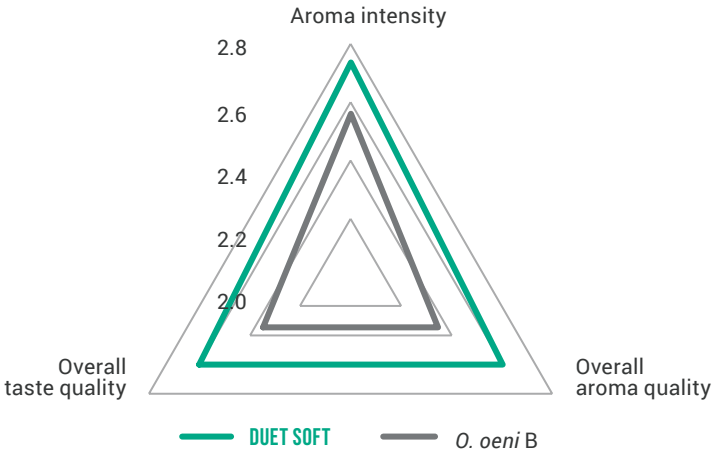
A comparison of the Duet bacteria range for co-inoculation (with tannin additions) and their impact on the aroma profile.



The *L. plantarum* strain with ß-D-glucosidase activity, like in **DUET AROM**, can liberate bound aroma compounds like monoterpenes and nor-isoprenoids. These compounds enhance the fruity and floral profile of the wine.



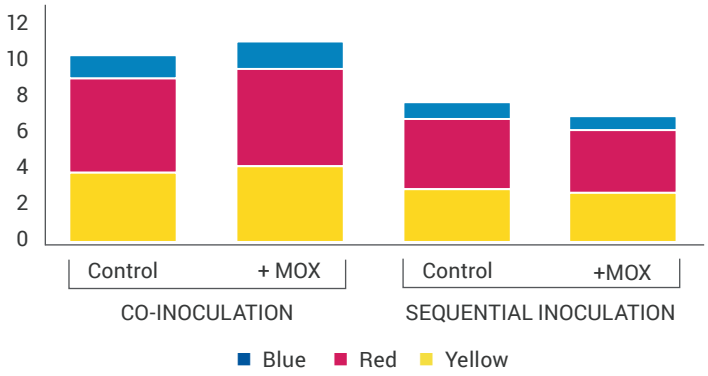
A blend of bacteria in comparison with an *O. oeni* culture in co-inoculation MLF in Tempranillo (Spain).



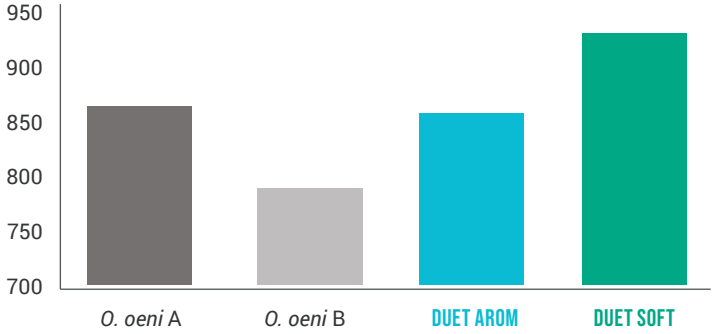
Impact on colour

The Duet range has been developed to positively impact on the colour by enhancing colour intensity and total anthocyanin concentration. These cultures are also fully compatible with micro- and macro-oxygenation and tannin additions during fermentation. In fact, these practices, together with the use of the Duet range, results in increased colour after MLF.

Impact of micro-oxygenation on colour intensity; comparing co-inoculation versus sequential inoculation (Tempranillo, Spain).

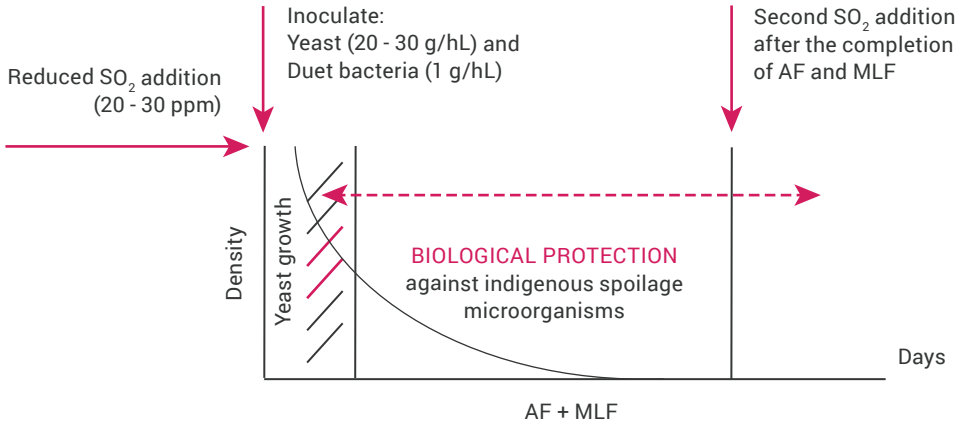


Anthocyanins (mg/L) after completion of co-inoculation (Tempranillo, Spain).



Bio-protection

With an increased interest in the sanitary state of wines (increased legislation and certification requirements), it is important to ensure that your wines are protected against unwanted microbial populations. Inoculating the Duet range at the beginning of the fermentation, allows for the usage of less sulphur. In addition, the bacteria strains present in the Anchor range are unable to produce biogenic amines or ethyl carbamate.



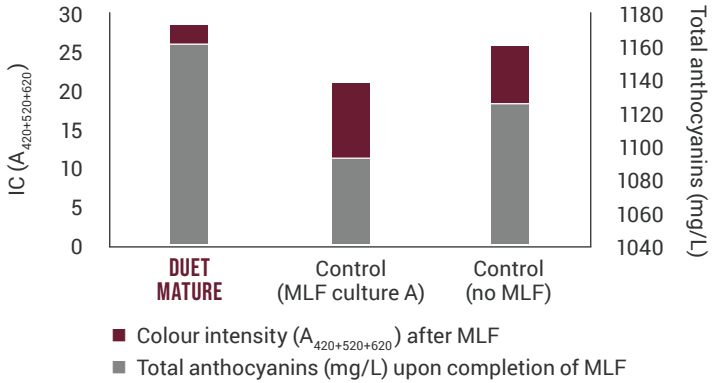
DUET MATURE

POSITIVE IMPACT OF DUET MATURE IN RED WINES

Colour

In order to display the positive impact of Duet Mature on the phenolic profile of a Spanish Merlot, we measured the total anthocyanin concentration and colour intensity (CI) after MLF. Both of these parameters were highest with Duet Mature, compared to another commercial co-inoculation culture and a treatment with no MLF. This means that the red wine colour is enhanced, especially in red wines destined for maturation.

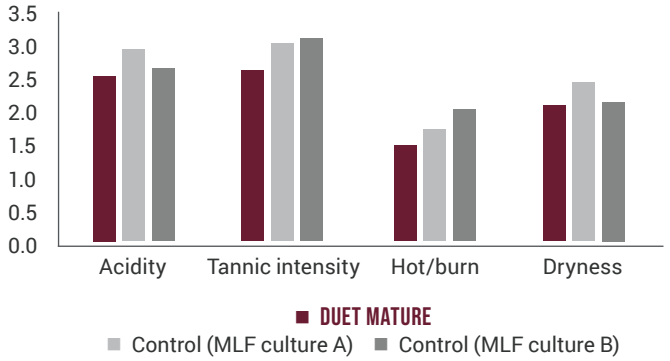
Enhanced phenolics with **DUET MATURE** | Spanish Merlot.



Quality

Besides the enhanced sensory profile delivered by Duet Mature, this bacteria culture also has the ability to reduce sensations that could negatively influence the wine quality. In a Spanish Tempranillo, Duet Mature had the ability to reduce characters of tannin intensity, hotness, dryness and herbaceousness.

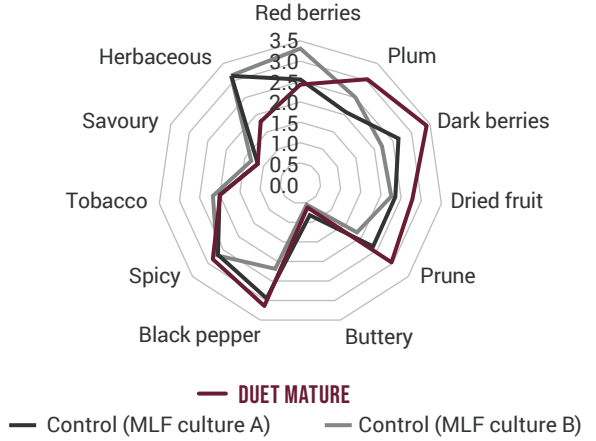
DUET MATURE vs. competitor bacteria | Spanish Tempranillo | Reduced negative sensations.



Aroma

As seen with the other blends in the Duet range, Duet Mature has a quality-enhancing aroma impact in the wine. Duet Mature significantly enhances the dark fruit profile, enhancing plum, prune, dried and dark fruit aromas. Duet Mature does not only enhance the sensory profile during MLF, but also significantly contributes to the aroma profile during the ageing period. Dimethyl sulphide (DMS), contributing blackcurrant and blackberry aromas, is released from the potential DMS (PDMS) during wine storage. Duet Mature produces PDMS and can contribute to the aroma profile of the wine even after bottling.

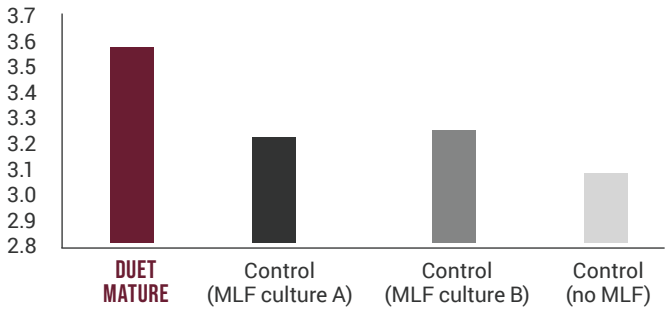
DUET MATURE in comparison with other commercial co-inoculation cultures | South African Cabernet Sauvignon.



Preference

With all these quality-enhancing aspects, it is clear why Duet Mature is the preferred wine when compared to other commercial cultures and a wine without MLF. For winemakers that want to use the process of MLF to also enhance wine quality, the Duet range is the perfect choice.

Sensory analysis after MLF - overall preference | Spanish Merlot.



SOLO RANGE

Wine quality and aroma during MLF

SOLO SELECT

The Solo Select bacteria is designed specifically for sequential inoculation. This range complements the Duet range for co-inoculation. This allows us to bring you a complete portfolio, with all the products focused on quality-enhancing malolactic fermentation (MLF).

Solo Select was developed in collaboration with the Australian Wine Research Institute and consists of a robust *Oenococcus oeni* strain isolated from the Yarra Valley in Australia. In keeping with our aim of providing you with bacteria products that enhance the sensory profile of the wine during MLF, Solo Select will enhance the spicy notes and palate structure of red wines. These aroma-enhancing capabilities are supported by the robust fermentation ability of the strain.

- Recommended for use in red wines.
- Displays good implantation and efficient fermentation kinetics.
- Tool for overcoming difficult MLF conditions.
- Enhances structure and complexity.
- Enhances spicy and dark fruit notes.
- Low volatile acidity production.
- Late degradation of citric acid and thus low diacetyl production.
- No production of biogenic amines.
- Can be used for both co-inoculation and sequential inoculation.

WHY SEQUENTIAL INOCULATION WITH SOLO?

- ✓ Security
- ✓ Sequential inoculation benefits
- ✓ Speedy MLF
- ✓ Impact on volatile acidity
- ✓ Impact on diacetyl
- ✓ Sensory benefits

Security

A robust *O. oeni* strain ensures a secure, complete MLF, even under challenging conditions.

	GENERAL *O. OENI* CHARACTERISTICS	SOLO SELECT
pH	2.9 - 4	≥ 3.2
Ethanol tolerance	16%	≤ 16%
Temperature tolerance	12 - 30°C	≥ 14°C
TSO_2 tolerance	50 - 60 ppm	≤ 50 ppm
VA production	Minimal to high levels	Minimal
Aroma impact	Enhance	Enhance

Sequential inoculation benefits

- Eliminate potential adverse interactions between the lactic acid bacteria and yeast cultures and avoid stuck or sluggish fermentations.
- Reduce the risk of the yeast producing undesirable metabolites if negatively impacted by the bacteria.
- Logistically easier to manage two fermentation processes separately.
- Decreased risks of volatile acidity production by the bacteria.
- Reduce the potential negative impact on colour.

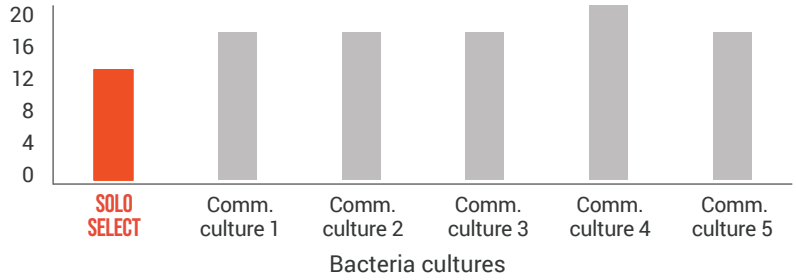
Speedy MLF

Solo Select is a robust *O. oeni* strain that ensures a speedy and complete MLF.

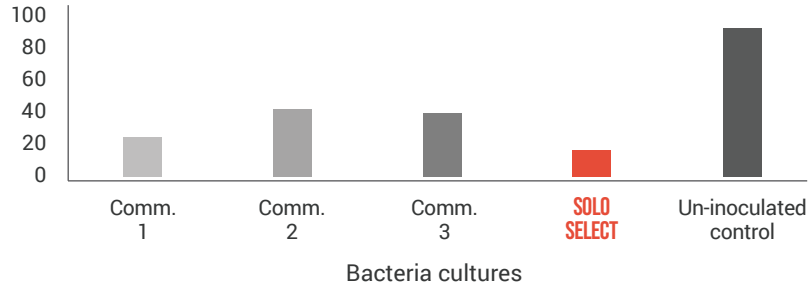
A comparison of the malolactic fermentation duration during sequential inoculation comparing SOLO SELECT with five commercial *O. oeni* cultures:

DURATION OF MLF

Days to complete MLF in a Cabernet Sauvignon (Gaillac, France)
(14.3% alcohol | pH 3.4 | 1.5 g/L malic acid).



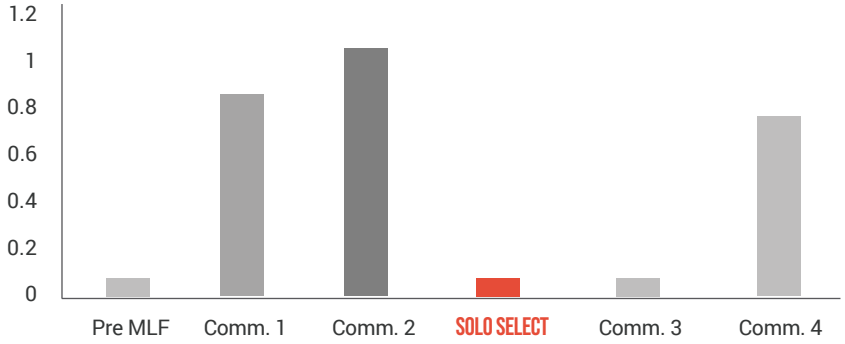
Days to complete MLF in Marlborough, Pinot noir (New Zealand).



Impact on volatile acidity and diacetyl production

Select is specifically selected for its ability to degrade citric acid at a much later stage in the MLF. This results in low diacetyl and volatile acidity levels.

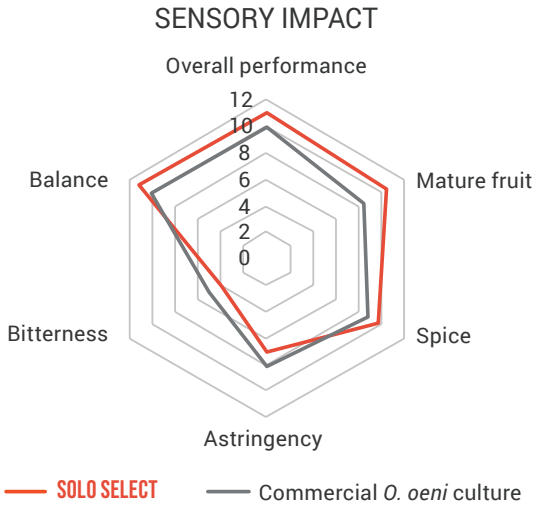
Diacetyl (mg/L) production in Chardonnay, Australia.



Sensory benefits

Solo Select enhances the following sensory characteristics in red wine: structure, complexity, spice and dark fruit aromas.

A comparison of **SOLO SELECT** and a commercial *Oenococcus oeni* culture in Merlot (Bordeaux, France).



> **“Expect more from your malolactic fermentation? So do we.**

Anchor OENOLOGY

Supporting you from grape to glass

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MORE PRODUCT INFO

See our ***Anchor Oenology Product Catalogue 2023*** for more product details.
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