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Technical Data Sheet – VINTAGE 2018

Characteristics of the vintage so far:

- Regular rain, and often too much at the wrong time
- Increase incidence of *Botrytis cinerea* and other disease
- Variable maturity in some blocks

Additional useful links:

- https://www.awri.com.au/wp-content/uploads/managing_botrytis_infected_fruit_fact_sheet.pdf

BOTRYTIS CINEREA:

Consequences of *Botrytis*:	**Winemaking Considerations:**
Maximise the quality by reducing the amount of mould-affected fruit at harvest	Thin out rot on the vine if machine picking or selectively hand harvest and sort
Poor juice yield	Use of appropriate enzymes with pectinase activity
Laccase in juice/wine	Consider heat treatment (pasteurisation)
Low must nitrogen and vitamin content - Due to the consumption of *Botrytis cinerea* for its own growth	Use vigorous yeast and complex nutrient addition *
Unwanted micro-organism development - Due to grape berry cell wall degradation	SO_2 must be sufficient Use of Lysozyme or other anti-microbial products (chitosan) to limit undesirable microbial activity *
Must browning and oxidation - By Botrytis polyphenol oxidase: laccase	- Bentonite fining to remove laccase - PVPP to remove polyphenols - Thermo-treatment - Use of tannins
Filter clogging - By Botrytis glucans	Beta-glucanases to ease filtration and increase filter cycles

* Refer to the current NZ Winegrowers International Winemaking Practices Guide

Treating *Botrytis* infected white grapes:

Winemaking stage:	Objective:	Options:
Vineyard	Antioxidant	SO_2 (PMS) Ascorbic acid Tannin
Harvest – Hopper – Destem/crush - Press	Reduce quality degradation	Ideally selectively hand-harvest and sort: - SO_2 @ 5-7 g/hL - Whole bunch press with CO_2 cover Machine harvest after rot removal by hand: - SO_2 @ 6-10 g/hL - Light pressing - Avoid skin contact - Limit juice yields - Consider free run and pressing options so that fractions can be tasted and pressings can receive further treatment - Tannin @ 5-10 g/hL
Settling / clarification	Avoid off flavours Avoid browning	Fast clarification/compact lees settling (<50 NTU) - Rapidase Clear (Dry) @ 3 g/hL if rot <20 % - Rapidase Batonnage @ 4 g/hL if rot >20 % Remove oxidisable phenolic compounds (esp. in pressings), discard heavy lees - Trial Bentonite additions to remove mouldy characters and settle for 24 hours, start trials @ 0.5 – 1 g/L (addition 6 hours after enzyme and rack off bentonite lees) - PVPP @ 40 g/hL Test for laccase activity – refer to sections below
Inoculation	Limit VA production Clean and complete fermentation	Control lactic acid bacteria with lysozyme - Delvozyme (Lysozyme) @ 100 mg/L Measure YAN (yeast assimilable nitrogen) in juice and refer to charts on Pg 18 for nutrient and addition Stage 1 nutrient addition: At inoculation for growing the yeast Use a vigorous yeast strain @ 25 g/hL - Fermivin LVCB - Fermivin 4F9 - Fermivin Champion
Fermentation	Complete fermentation, enhance yeast viability	Supplement the must as this will be lacking in vitamins and nutrients, especially thiamine Stage 2 nutrient addition: Once the ferment is fully active and Brix dropped 2-3 ^oBx. Nutrient for new generations of yeast Stage 3 nutrient addition: Mid-fermentaion before 10 ^oBx. Replenish supply in existing cells to finish the ferment. The lees will contain much of the laccase, rack off fermentation lees as soon as possible. Keep wine in stainless steel with inert gas cover if on ullage. Test for laccase activity – refer to sections below
Malo-lactic fermentation (optional)	Partial or complete fermentation	Using select Chr. Hansen ML Bacteria - Keep within alcohol, pH, TSO_2 tolerance ranges per specific bacteria as the higher level of malic acid is more of a challenge to MLB - Consider yeast strains that can metabolise malic acid during alcoholic fermentation - Consider co-inoculation options
Filtration	Degradation of pectins and glucans responsible for filter clogging	Rapidase Batonnage @ 3-5 g/hL Min. 3 weeks prior to filtration and keeping the wine at 18+ ^oC

Treating *Botrytis* infected red grapes:

Winemaking stage:	Objective:	Options:
Vineyard	Antioxidant	SO_2 (PMS)
Harvest	Reduce quality degradation	Ideally hand-harvest and sort: - SO_2 @ 6-8 g/hL Machine harvest: - SO_2 @ 8-10 g/hL
Pre-fermentation		Best to avoid cold soaking or keep this stage as short as possible and exclude air
	Inhibit laccase effects	Remove oxidisable phenolic compounds Tannin (proanthocyanidic + ellagic) @ 30-50 g/hL
	Colour extraction and stabilisation	Colour and polyphenol extraction with less physical manipulation (make additions at a different time to tannin and SO_2): - Rapidase Extra Fruit @ 3 g/hL, if rot < 25-30 % - No enzyme is rot > 30 %
	Limit VA production	Control lactic acid bacteria - Delvozyme (Lysozyme) @ 200 mg/L Test for laccase activity – refer to sections below
Inoculation	Clean and fast fermentation	Measure YAN (yeast assimilable nitrogen) in juice and refer to charts on Pg 18 for nutrient and addition Stage 1 nutrient addition: At inoculation for growing the yeast Use a vigorous yeast strain @ 25 g/hL or more to assist with binding FSO_2 - Fermivin VR5 - Cepage Cabernet / Merlot / Pinot / Syrah
Fermentation	Complete fermentation, enhance yeast viability	Supplement the must as this will be lacking in vitamins and nutrients, especially thiamine Stage 2 nutrient addition: Once the ferment is fully active and Brix dropped 2-3 ^oBx. Nutrient for new generations of yeast Stage 3 nutrient addition: Mid-fermentaion before 10 ^oBx. Replenish supply in existing cells to finish the ferment.
	Stabilize colour Avoid off flavours	Tannin @ 20-30 g/hL Short maceration of 4-6 days Avoid delestages and punch downs Limit pump overs to every 2 days
Draining / pressing	Avoid rough handling of pomace	Light pressing, steady pressing to stainless steel Keep fractions separate Limit number of roll overs Rack off gross lees after 24 hrs Test for laccase activity – refer to sections below
Malo-lactic fermentation (optional)	Complete fermentation	Using select Chr. Hansen ML Bacteria - Keep within alcohol, pH, TSO_2 tolerance ranges per specific bacteria as the higher level of malic acid is more of a challenge to MLB - Consider yeast strains that can metabolise malic acid during alcoholic fermentation - Consider co-inoculation options
Filtration	Degradation of pectins and glucans responsible for filter clogging	Rapidase Batonnage: - @ 3 g/hL first press wine - @ 5 g/hL on pressings Min. 3 weeks prior to filtration and keeping the wine at 18+ ^oC

QUALITATIVE TEST FOR LACCASE:

- Add SO_2 to the sample to give a TSO_2 of 60 mg/L
- Pour 50 ml of the sample in 2 wine glasses
- Cover each with a watch glass or petri dish
- Place one sample into a refrigerator
- Leave one sample on the bench at ambient temperature
- Examine samples after 24 hours
- Compare for any change in colour or quality
- If there is laccase activity, the sample on the bench should be browner than the sample in the fridge and may have an oily film on the surface of the wine

After 24 hours:

Fridge sample **Bench sample**

QUANTITATIVE TEST FOR LACCASE:

- Quantitative determination of laccase activity is achieved by commercially available enzymatic test kits

TREATMENT FOR LACCASE:

- Heat treatment (pasteurising) should be considered to deactivate the laccase enzyme before conducting fermentation
- Recommendations:
    - Juice be pasteurised at a minimum temperature of 65 ºC for 40 seconds
    - Wine be pasteurised at a minimum temperature of 65 ºC for 20 seconds
- If heat treatment is not an option, initiate fermentation as soon as possible
    - Addition of 0.1-0.2 g/L of bentonite during fermentation maybe beneficial
- Post-ferment, if laccase activity is still detected, consider heat treatment options

LOW MATURITY:

Consequences of low maturity:	**Winemaking Considerations:**
Ensure blocks are uniformly sampled or break them into smaller, uniform blocks	Evaluate skin astringency and seed lignification (browning)
Low Brix, potential alcohol (enrichment)	Sugar level addition *
High acid (deacidification)	Lowering the acidity allows an increase in the wines mouthfeel and eases MLF onset *
Low pH	Measure pH as well as FSO_2 in juice to calculate molecular SO_2 (MSO_2). Aim to go into inoculation with a MSO_2 < 0.5 mg/L

* Refer to the current NZ Winegrowers International Winemaking Practices Guide

White Grapes:

Winemaking considerations:	**Objective:**	**Options:**
Improved pressing and settling	The pectin content of low maturity grapes is naturally quite high. The pectin electrostatic and gellifying properties maintain particles responsible for haze in suspension and lower juice yields.	Added at the crusher or during skin contact: Rapidase Extra Press @ 250 g/T - Allows a free run juice yield increase and eases pressing and clarification At settling and clarification: Rapidase Clear, powder @ 3 g/hL - Used after pressing to break down long chains of pectin to allow for fast clarification and compact lees settlement
Preserve the aromatic profile	Aiming to avoid green and vegetal characters	- 100 % Destem - Skin contact - Taste during separation of free run and pressings juice - Ferment with enzymes matched to release aromatic compounds
High Malic acid levels	Partial or complete MLF	- Keep within alcohol, pH, TSO_2 tolerance ranges per specific bacteria as the higher level of malic acid is more of a challenge to MLB - Consider yeast strains that can metabolise malic acid during alcoholic fermentation - Consider co-inoculation options
Enhance organoleptic balance during aging	Enhance aging on fine lees	Rapidase Batonnage @ 3-5 g/hL for 3 weeks after fermentation - Pectinases and beta-glucanases are used to enhance the natural yeast autolysis

Red Grapes:

Winemaking considerations:	Objective:	Options:
Handling phenolic maturity deficiency	The challenge is to extract a maximum of colour without extracting harsh tannins	- Destem - Favour pre-ferment maceration with high temperature - Increase pomace/juice ration by removing juice after 12-24 hrs depending upon variety and wine style - Short maceration of 6-8 days Use of extraction enzymes like Rapidase Extra Colour @ 30g/T - With concentrated pectinases and hemicellulases activity to optimize phenolic compound extraction - Ferment at high temperature 28-30 ^{o}C - Utilise yeast strains for red winemaking - Avoid must movements during the later part of alcoholic fermentation - Avoid delestages - Favour punch downs and pump overs with air
Colour stabilization – during fermentation	Add proanthocyanidic tannins (grape origin) alone or in combination with ellagic tannins	- 30 g/hL of tannin 3 days after the onset of fermentation - Allows anthocyanins to polymerise and protects them from oxidation
Colour stabilization – during fermentation	Use micro-oxygenation	- Allows for anthocyanin and tannin polymerisation and softens the wines phenolic structure
High Malic acid levels	Complete MLF	- Keep within alcohol, pH, TSO_2 tolerance ranges per specific bacteria as the higher level of malic acid is more of a challenge to MLB - Consider yeast strains that can metabolise malic acid during alcoholic fermentation - Consider co-inoculation options