

WHITE AND ROSÉ WINES

Managing Green Characters

WHICH COMPOUNDS ARE RESPONSIBLE FOR GREEN NOTES IN WINE?

Most compounds that cause unwanted green notes in wine are synthesized by grapes and concentrated in the skins. These belong to two groups:

Methoxypyrazines: Responsible for herbaceous, green bell pepper, asparagus, pea and earthy aromas. Sensitive to heat, methoxypyrazines concentration can be lowered by thermo-treatment or/and high temperature fermentation.

C6 Compounds: Characterized by unpleasant green aromas such as tomato leaf and cut grass. Present in unripe grapes, these compounds can also be formed from unsaturated fatty acids through an enzymatic cascade.

HOW TO REDUCE GREEN CHARACTERS IN WINE?

1. Good **anti-oxidant protection** is necessary to limit the formation of more C6 compounds by enzymatic oxidation of lipids
2. **Limit skin contact** to reduce extraction of off-aromas: whole cluster press, no crushing, no destemming and separate press fractions
3. **Fast and strong clarification:** solids are bound to off-flavors, green characters and toxins that can alter fermentation and wine quality
4. **Compensate** for the short skin contact with **fast extraction of polyphenols** using specific extraction enzyme
5. Proper yeast nutrition strategy:
 - o **Nutriferm Arom Plus** provides essential nutrients for proper yeast development and aromatic precursors at inoculation
 - o **Nutriferm Advance** to help yeast with resistance to stress and reduce production of H₂S (add at 1/3 sugar depletion)
 - o **Nutriferm No Stop** improves yeast cell membrane fluidity, yeast fermentation activity and resistance to stress and ensure a complete fermentation (add at 1/2 of fermentation)
6. Balance wine mouthfeel with mannoproteins and fermentation tannins
7. Mask some green notes during fermentation:
 - o Use of oak alternatives
 - o Use of sulfur donor compounds (such as yeast derivatives rich in sulfur containing aminoacids and peptides) to promote the conversion of C6 compounds into thiol precursors

PROTOCOL

STAGE	OBJECTIVE	ENARTIS PRODUCTS	DOSE
Harvest/ Vineyard	Antioxidant	AST is a blend of ascorbic acid, gallic tannins and SO ₂ for complete antioxidant protection. 100ppm of AST = 28 ppm SO ₂ .	
<i>Reduce skin contact - keep low temperature – gentle press cycle – limit rotation - separate press fractions. Adjust pH and acid at juice stage: <u>pH and Acid Management Panel</u> Recommended analysis: <u>Juice Panel</u></i>			
Press Pan	Settling Enzyme	Enartis Zym RS : Pectinase and hemicellulase developed for difficult settling. Rapid settling and intense clarification.	2-3 mL/hL
	Fining Agent	Claril SP : Blend of bentonite, PVPP, potassium caseinate and silica. Removes laccase, oxidizable and oxidized phenols and negative “moldy” aromas. Increase dosage to 50- 80 g/hL on pressings.	30-50 g/hL
<i>Recommended turbidity < 150 NTU</i>			
Inoculation	Nutrients	<i>At inoculation, adjust YAN>150 ppm with complex nutrient.</i> Nutrifer Arom Plus provides essential nutrients for the proper yeast development: amino acids, vitamins and mineral salts and aromatic precursors to enhance fermentation aromas.	30 g/hL
	Yeast (select one)	Enartis Ferm ES181 : <i>S.cerevisiae</i> strain with short lag phase, fast fermenter and low nitrogen needs that produces a large amount of secondary aromas. Enartis Ferm Aroma White : <i>S. cerevisiae</i> with β-lyase and β-glycosidase activities. Increases varietal aroma production and produces high amounts of secondary aromas.	20 g/hL
	Polysaccharides	Enartis Pro Blanco : Yeast cell wall polysaccharides rich in sulfur-containing peptides. Acts in synergy with Enartis Ferm ES181 or Enartis Ferm Aroma White to transform C6 compounds into thiolic compounds. Promotes varietal aroma production, reduces green characters and balances mid-palate.	40 g/hL
<i>Fermentation temperature: 14-18°C (57-64°F) – not higher than 20°C (68°F) Rack wine from gross lees toward end of fermentation</i>			
1/3 Fermentation	Yeast Nutrients	Nutrifer Advance : Organic and inorganic nitrogen, yeast cell walls rich in sterols and fatty acids and cellulose. Helps yeast with stress resistance, detoxifies wine, ensures complete fermentation and reduces production of H ₂ S.	30-50 g/hL
	Oxygen	Enartis MicroOx or pump-over.	10 mg/L
	Oak Alternative	Incanto NC White : Soluble oak extract (untoasted oak tannin, acacia tannins and yeast polysaccharides). Mimics the effect of untoasted oak chips. Decreases off-flavors, protects against oxidation, prevents reduction and increases wine volume.	
1/2 Fermentation	Yeast Protection	Nutrifer No Stop : Purified yeast cell walls rich in fatty acids and sterols to improve yeast cell membrane fluidity, yeast resistance and fermentation activity. Highly recommended in high temperature fermentations.	20 g/hL
<i>Recommended analysis: Alcohol, Residual Sugar, pH, TA, Malic Acid, Microscan Rack from fermentation lees + add SO₂ For ageing, use 20 g/hL of Surli One or Stab SLI</i>			

The above is achieved to the best of our knowledge and experience.
The industrial application of the advice provided does not imply any responsibility on the part of our company.

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