



## Driving Wine Style with Enartis Tools

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# WEBINAR OVERVIEW

- 40 min presentation
- Have a pen and paper
- Only use chat box #2 for technical difficulties
- Recording in progress!
- Attached documents





# TOPIC OVERVIEW

- Wine styles
- Yeast activities and fermentation aromas in white and red grapes
- Nutrients for aroma differences
- ML as a stylistic driver

## *What defines a wine style?*

Varietal characteristics – Riesling, Cabernet Sauvignon, Muscat

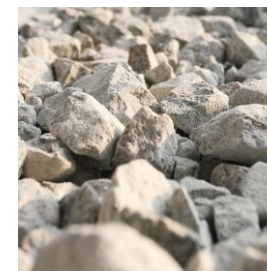
Aromas + flavors – fruity, floral, citrus, oaky?

Acidity – what's the best balance?

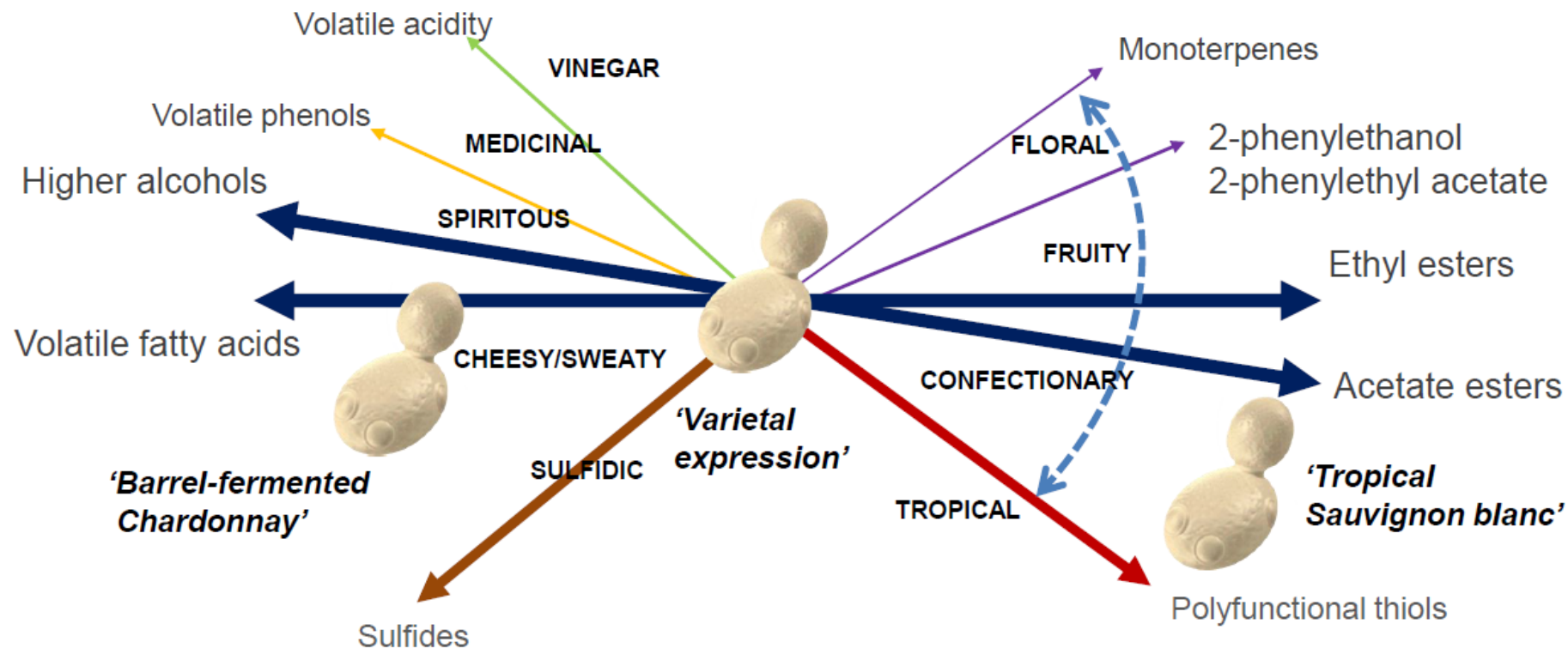
Sweetness – actual or perceived

Mouthfeel – crisp, soft, structured

General impression – mineral, new world, old world



# YEAST + FERMENTATION AROMAS

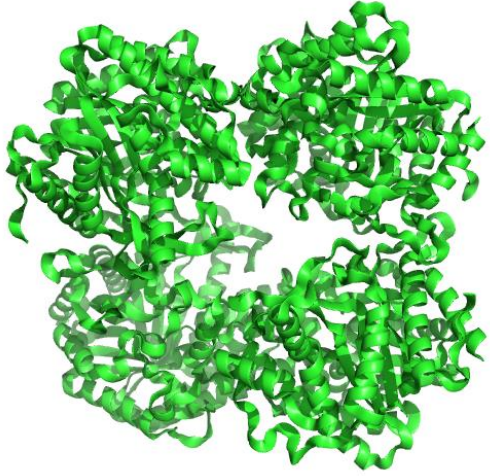


Source AWRI

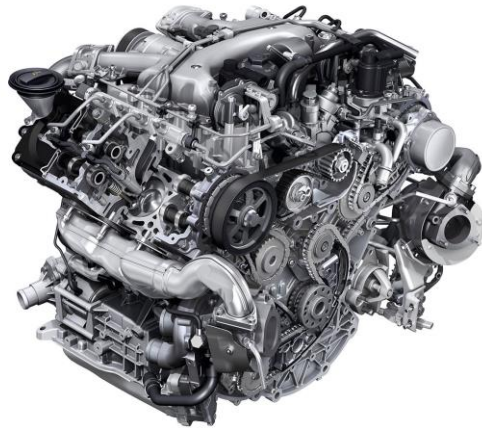
Adapted from Cordente et al Flavour-active yeasts  
Appl. Microbiol. Biotechnol. (2012) 96: 601-618



# YEAST CHOICE – IMPORTANT YEAST ENZYMATIC ACTIVITIES



$\beta$ -GLUCOSIDASE  
proteins structure



## Yeast machinery:

- $\beta$ -GLUCOSIDASE activity
- Alcohol acetyl transferase activity
- $\beta$ -Lyase activity





# YEAST CHOICE – TERPENIC WHITES



Very high  $\beta$ -glucosidase activity  
Enhances terpene and citrus  
aromas



Low MW grape tannin and tannin derived  
from lemon wood  
Glycoconjugated terpenic + norisoprenoid  
precursors

2 - 10 g/hL **DURING** fermentation



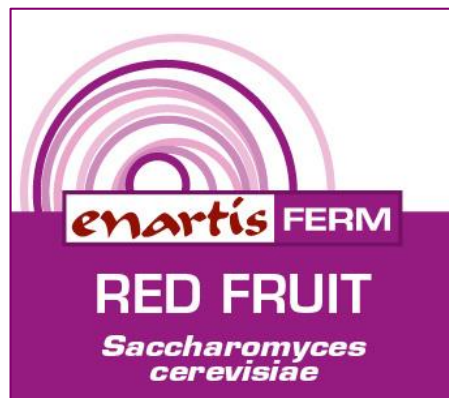


# YEAST CHOICE - FRUIT FORWARD REDS

- Yeasts with very high  $\beta$ -glucosidase activity which can liberate norisoprenoids
- Produce elegantly balanced red wines with a strong fruit profile



OR



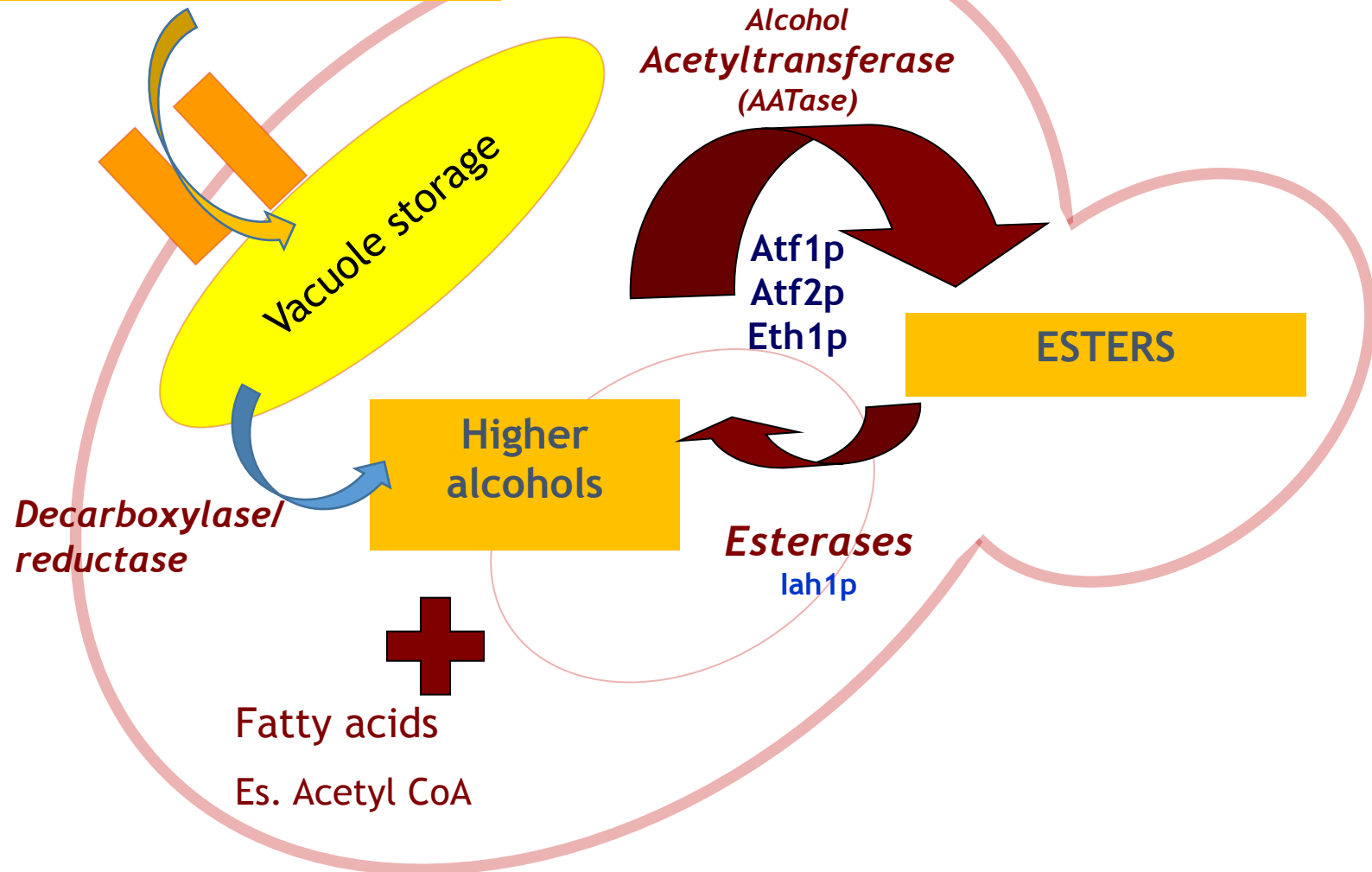
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- Grape tannins and tannins extracted from red fruit trees
- Glycoconjugated norisoprenoids

# YEAST ACTIVITY – ACETYLTRANSFERASE

*Free branched-chained aminoacids*





# YEAST CHOICE – HIGH ACETYLTRANSFERASE ACTIVITY



Very aromatic floral  
white wines



Intense and complex fruit  
profile



# AMINO ACID NUTRIENTS FOR AROMATIC IMPACT

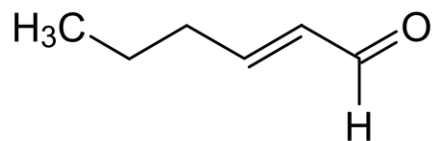


- Amino Acids specific for aromatic ester/acetate production
- Fruity/floral aromatic production
- Neutral grapes
- Stylistic differentiation



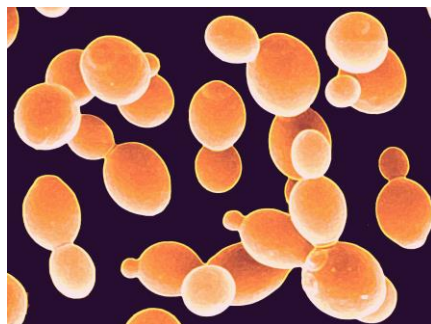
- Varietal aromas
- Clean + steady fermentation

# YEAST ACTIVITY - $\beta$ -LYASE

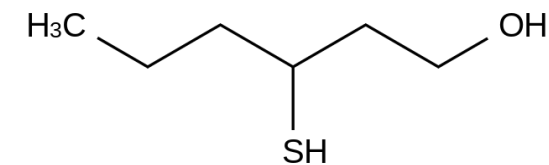
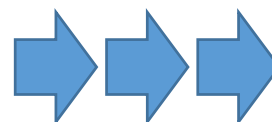


2-Hexanal  
Green  
character

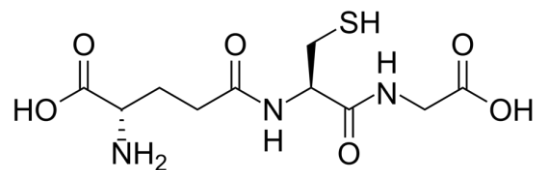
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Yeast - high  $\beta$ -lyase  
activity



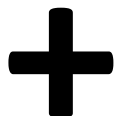
3 MH – 3-mercaptohexanol  
Tropical/ fruity



Glutathione - odorless



# YEAST CHOICE – THIOLIC WHITES



High MW hydrolysable  
tannins + yeast derivatives

- Liberation of 3MH –grapefruit  
passion fruit, gooseberry
- Liberation of 4MMP – black  
currant, passionfruit, boxtree
- Transformation of green - fruity

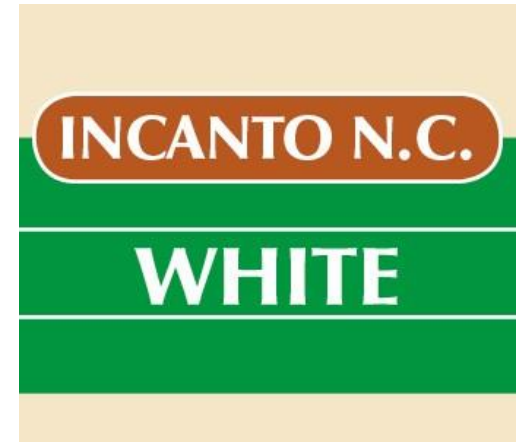
	Ref.	ES181	Threshold
3-mercaptohexan-1-ol (3MH), ng/L	1766	2567	60
3-mercaptohexyl-acetate (3MHA), ng/L	1111	1418	4
4-mercapto-4-methylpentan-2-one (4MMP), ng/L	<11	16	0.8

*Grapefruit/ passionfruit*  
*Boxwood / guava*  
*Citrus*

# YEAST CHOICE – GREEN REDUCTION IN REDS



- High  $\beta$ -lyase activity
- Excellent fermentation kinetics
- Great aromatic impact



- Untoasted oak tannin
- Yeast derivatives with SH peptides



# WINE STYLE- MINERAL WHITES

- Low pH
- High Malic acid
- Turbidity in juices (whites)
- Succinic acid (reds)
- Low Redox potential
- FSO<sub>2</sub> and TSO<sub>2</sub>
- Aromas/Mouthfeel:
  - High Acidity
  - Vegetal
  - Octanoic acid
  - Alcohol B-phenylethanol
  - Benzylmercaptan, Furfural, 5-methylfurfural, Sulfur compounds
  - TDN

- Lactic acid
- Oxidation, O<sub>2</sub> exposure
- Aromas/Mouthfeel:
  - Fruity, isoamyl acetate, ethylacetate
  - Isobutyric acid
  - Round/balanced mouthfeel

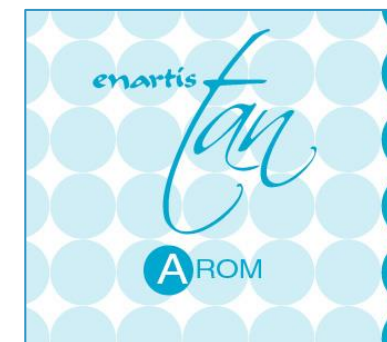


# YEAST CHOICE - MINERAL WHITES

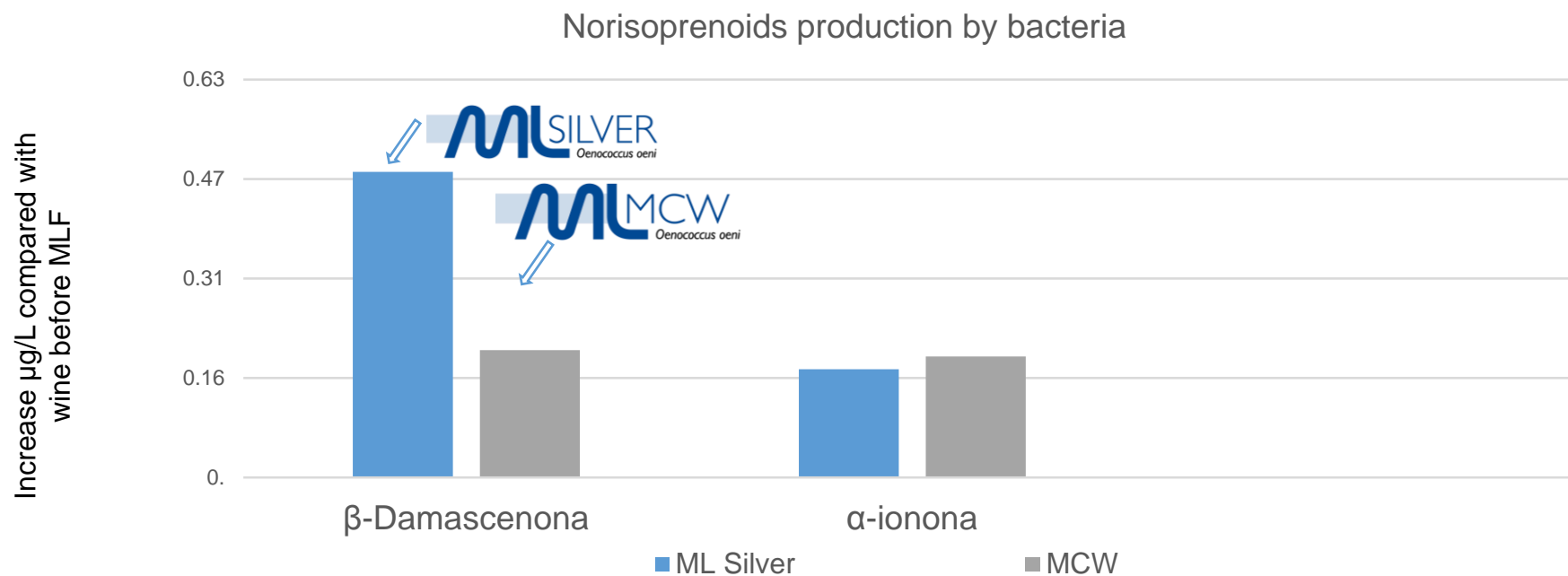
(ng/L)	Ref	ES181	PERLAGE	<b>Q9</b>	Sensory Threshold	
<b>2-Methyl-3-furanthiol</b>	543	649	898	<b>1502</b>	4	Roasted Coffee
4-Mercapto-4-methyl-2-pentanone (4MMP)	2.2	<b>7.5</b>	2.2	1.1	0,8	Citrus
3-mercaptohexyl acetate (3MHA)	235	174	232	186	4	Boxwood
3-Mercaptohexanol (3MH)	1255	1726	1549	1906	60	Grapefruit
Ratio 3MH/3MHA	5.3	9.9	6.7	10.2		
<b>Benzyl mercaptan</b>	1.7	< L.D.	2.1	<b>6.4</b>	0.3	Smoky, Flinty
<b>PhenylEthanol</b>	0.04	1.62		3.81		Rose, Orange blossom

- **Enartis Ferm Q9** increases the concentration compounds related to minerality

*Analysis made by Zaragoza University 7 months after the harvest*



# DIRECTING STYLE WITH ML



Compound	Odour threshold µg/L	Odour description
β-Damascenone	0,05	sweet, fruity
α-Ionone	2,6	violet-like, fruity, raspberry-like, flowery



# ENHANCING or DECREASING DIACETYL

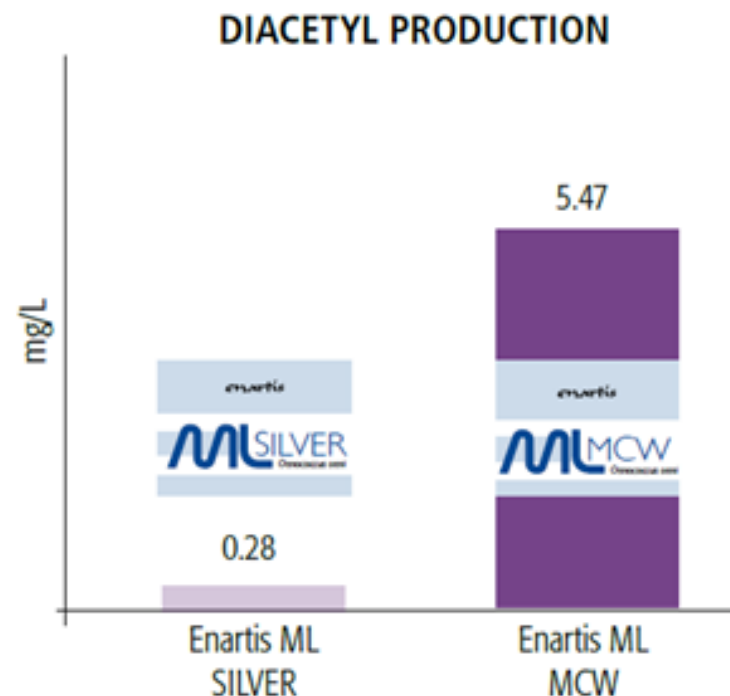
Diacetyl = buttery

Techniques for enhancing:

- Use high Diacetyl producing ML MCW
- Citric acid
- Stop ML after peak diacetyl
- Limit molecular SO<sub>2</sub> levels
- Some oxygen

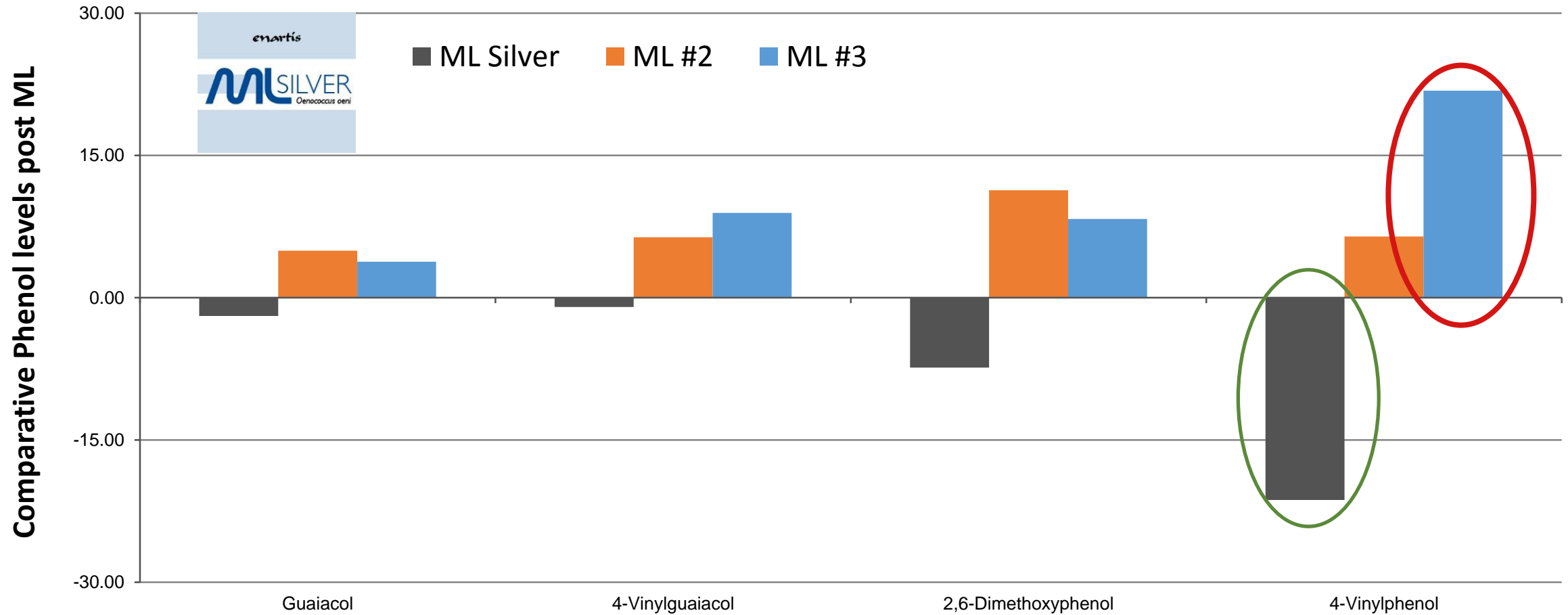
Techniques for decreasing

- Fast ML fermentation
- Use low diacetyl producing strain: ML Silver
- Let ML continue after malic conversion
- Use normal SO<sub>2</sub> levels
- Reductive conditions





# DECREASING VOLATILE PHENOLS WITH ML





# THANK YOU FOR YOUR ATTENTION!

- Please fill out our survey!
- Useful downloads
- *More useful info and webinar videos @*  
<http://www.enartis.com/us/focus-on>
- Now, 20 minute Q&A!
- To reach the Enartis team:
- Call: (707)838-6312
- Email: [Jasha.Karasek@Enartis.com](mailto:Jasha.Karasek@Enartis.com)

