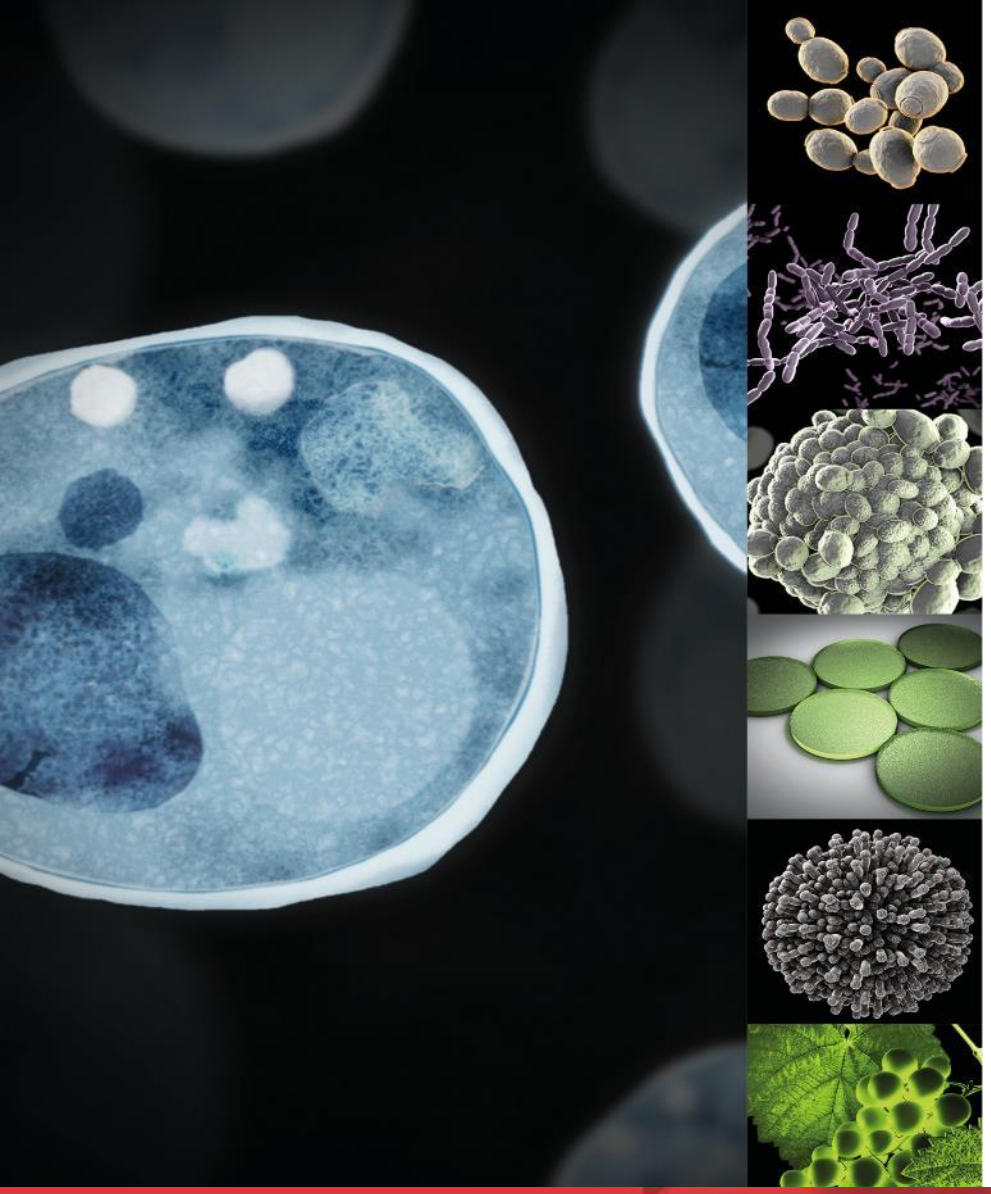

Less SO_2 winemaking and better aroma protection with Glutastar™

Webinar June 2024

SPECIFIC YEAST DERIVATIVES

Content

I) Origin and impact of oxygen in must and wine

II) Improve naturally the wine nucleophilic content

III) Evidence of antioxidant activity

IV) Field results

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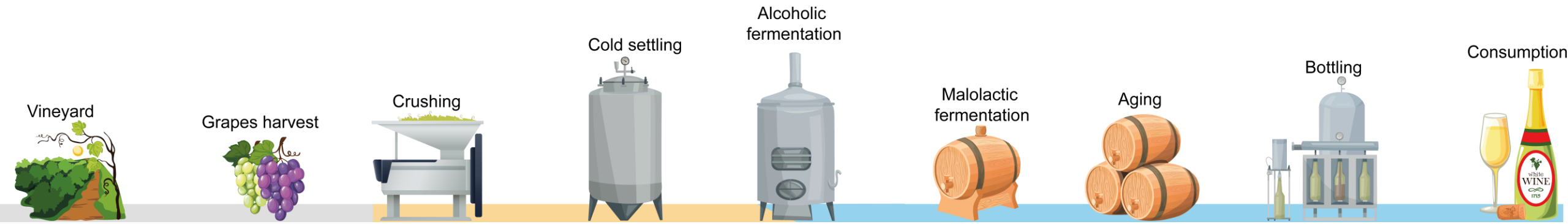
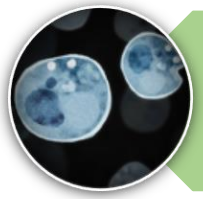
Original by culture

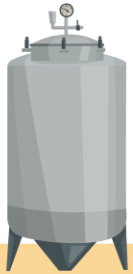


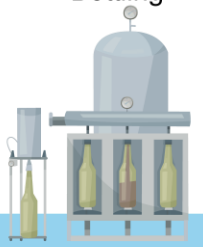
I) Origin and impact of oxygen in must and wine



Manage oxidation in winemaking

Formal chemistry





Building the intrinsic antioxidant capacity

Mostly enzymatic oxidation

Mostly chemical oxidation

Must browning

Early loss of protective compounds

Appearance of off-flavours

Loss of varietal aromas

Wine browning

« Antioxidants » for oenologist

Compounds or practices limiting the appearance of wine damages

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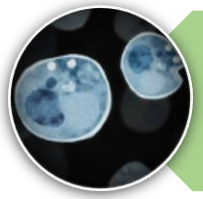
Original by culture

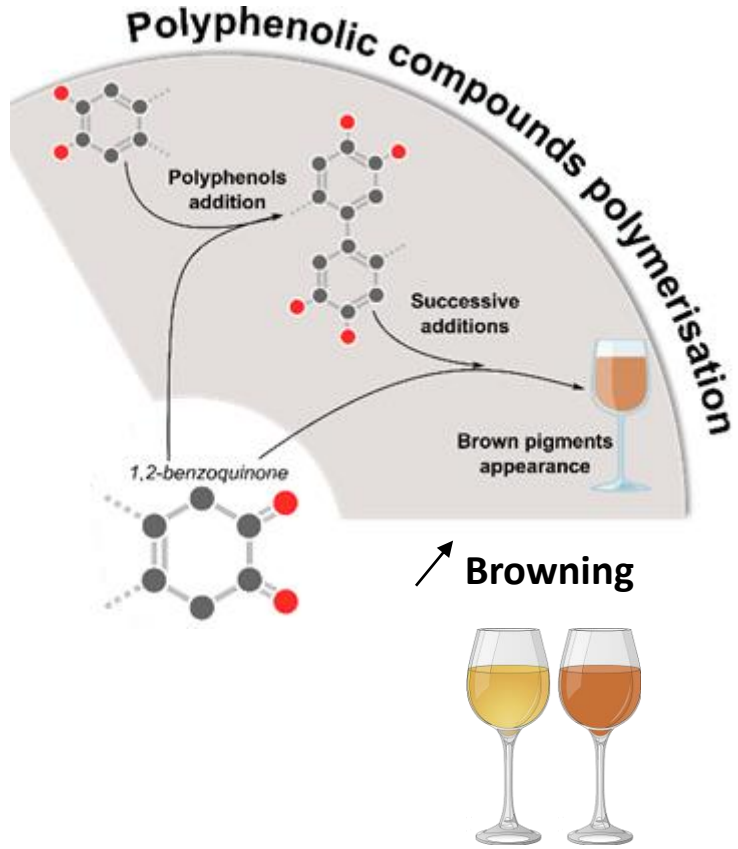


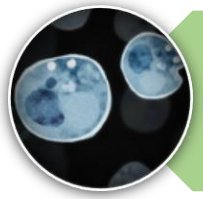
Manage oxidation in winemaking

Oxidative damage on wine

Main mechanisms leading to wine defects

- ***Polymerization*** of quinones with other phenolic compounds
  => browning



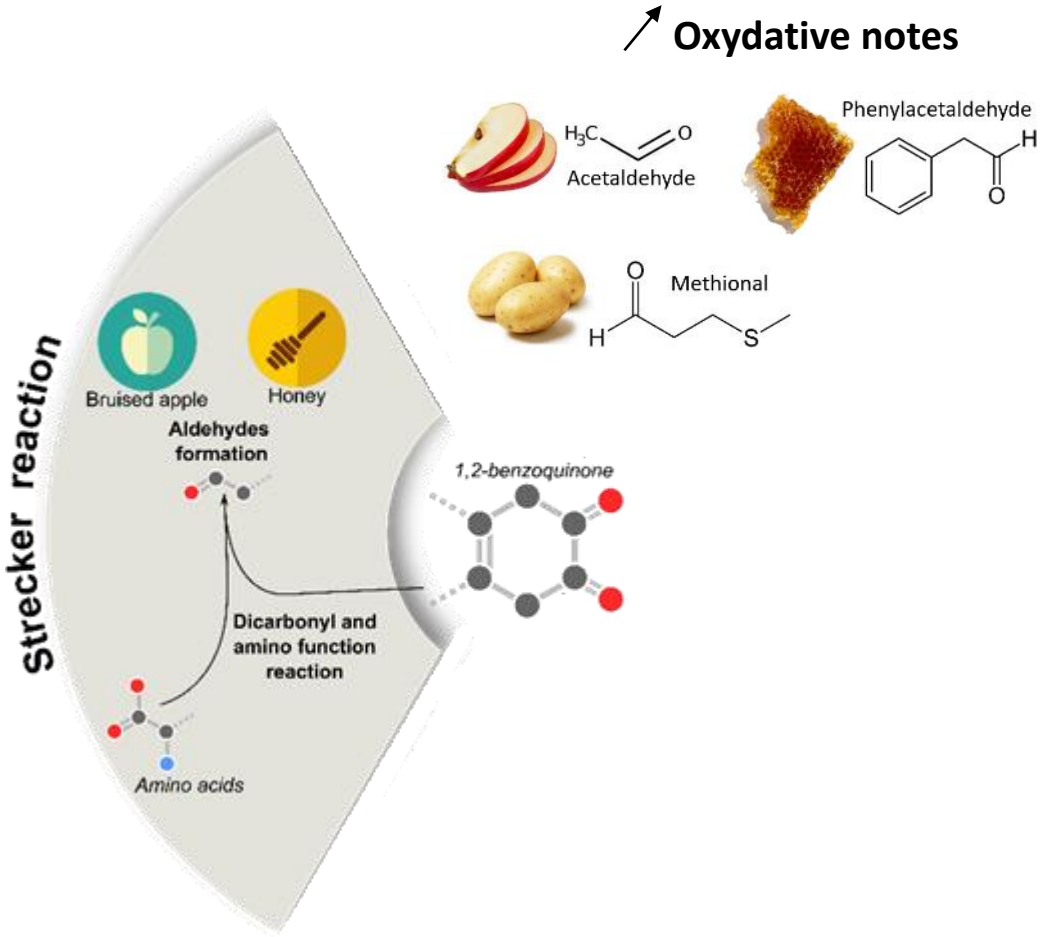


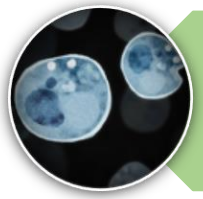
Manage oxidation in winemaking

Oxidative damage on wine

Main mechanisms leading to wine defects

- ***Polymerization*** of quinones with other phenolic compounds => browning
- Reaction with amino acids *via* ***Strecker reaction*** => unwanted aromas at high concentration





Manage oxidation in winemaking

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- ***Polymerization*** of quinones with other phenolic compounds
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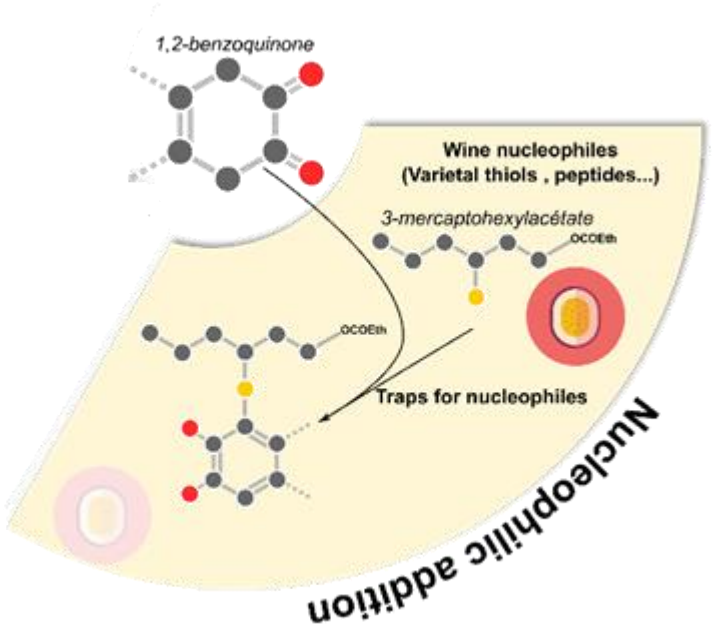
  => unwanted aromas at high concentration
- ***Trapping varietal thiols***
  => reduction of global aromatic quality



Volatile thiols

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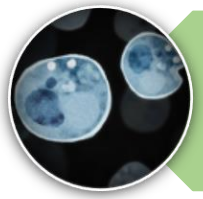
Original by culture



Manage oxidation in winemaking

Oxidative damage on wine

Main mechanisms leading to wine defects

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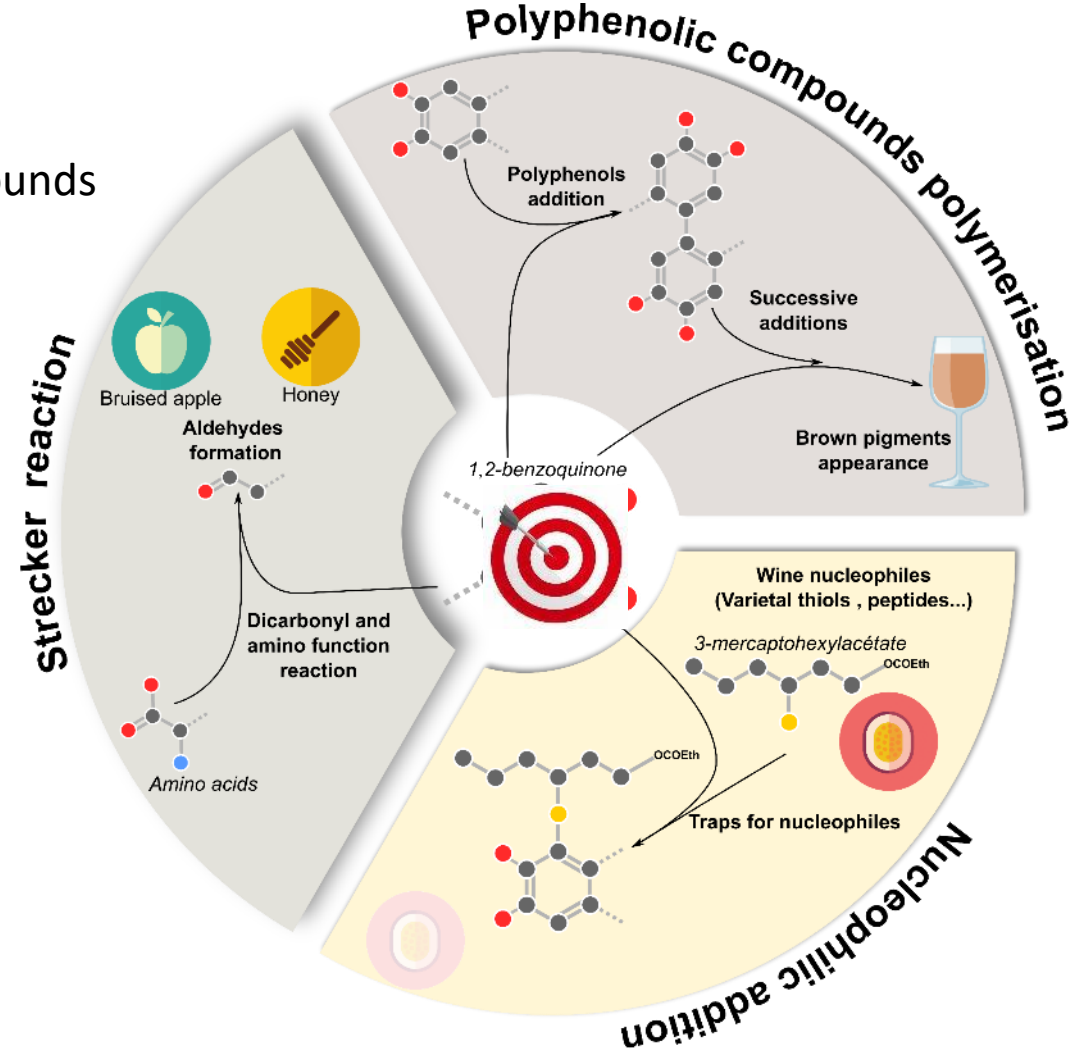
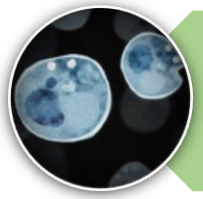


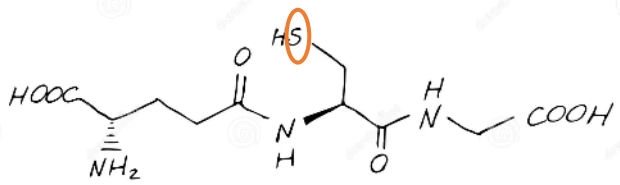


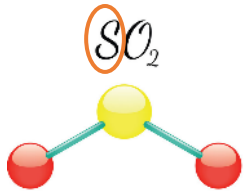
Manage oxidation in winemaking

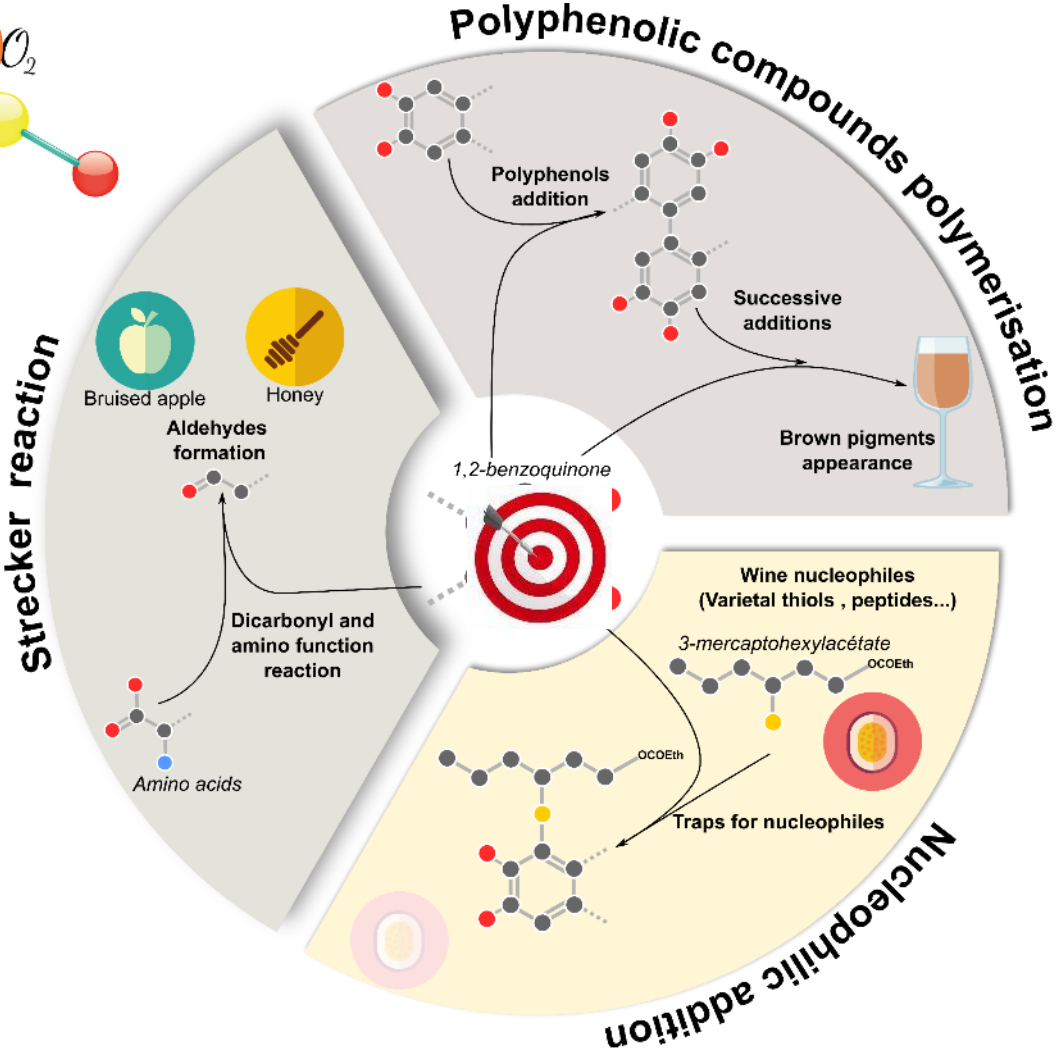
Tools available to target quinones

- Traditionnally, **sulfites (SO_2)** are used as antioxidant compound to reduce quinones
- But other compounds are also able to trap quinones, such as **glutathion (GSH)**, in its reductive form

Glutathion







SPECIFIC YEAST DERIVATIVES

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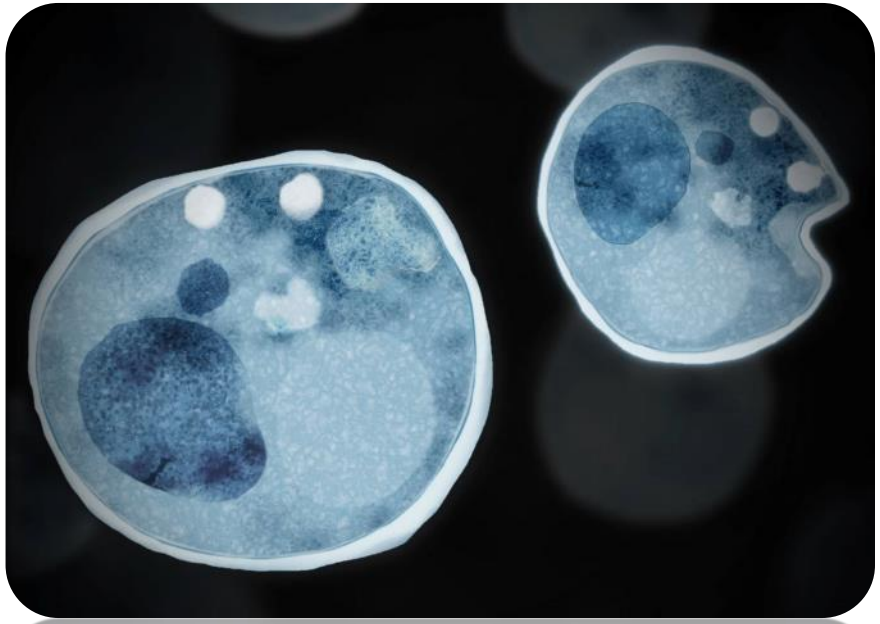
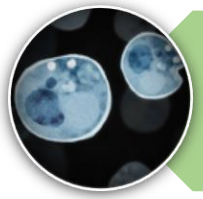
Original by culture



II) Improve naturally the wine nucleophilic content

Specific Yeast Derivatives (SYD) naturally rich in glutathione,
and much more…



SYD process in brief

Metabolic scale

Saccharomyces cerevisiae metabolic network

CHO
CHOS
CHON
CHONS

Few metabolites proposed in literature to monitor glutathione accumulation

GSH

SPECIFIC YEAST DERIVATIVES

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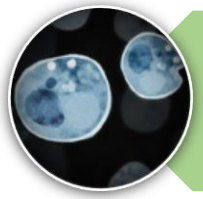
Original by culture



SYD process in brief

Metabolic scale

Saccharomyces cerevisiae metabolic network

CHO
CHOS
CHON
CHONS

GSH

Actually, many beneficial metabolic changes can occur

SPECIFIC YEAST DERIVATIVES

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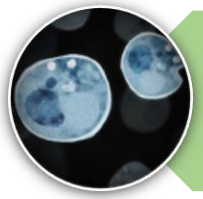
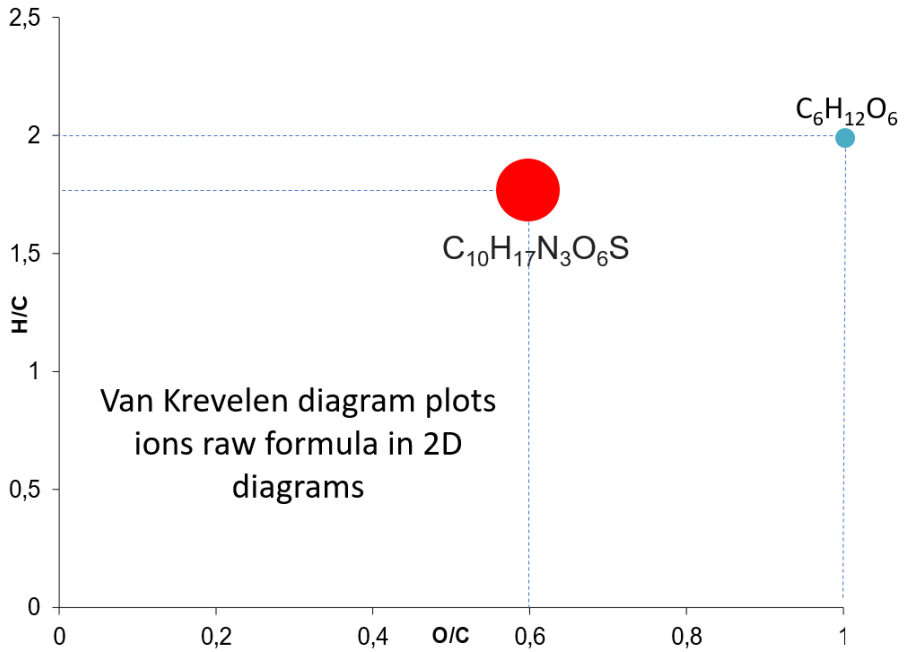
Original by culture



Metabolomic fingerprint

SPECIFIC YEAST DERIVATIVES

- **Metabolomics: analytical method aimed to describe a set of samples based on their chemical composition (metabolites)**
  - Ultra HPLC with a high-resolution mass spectrophometer
  - It can give the fingerprint of different products according to their elementary compositions in C, H, O, S, N



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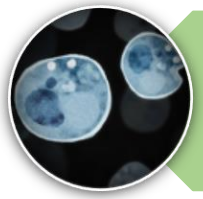
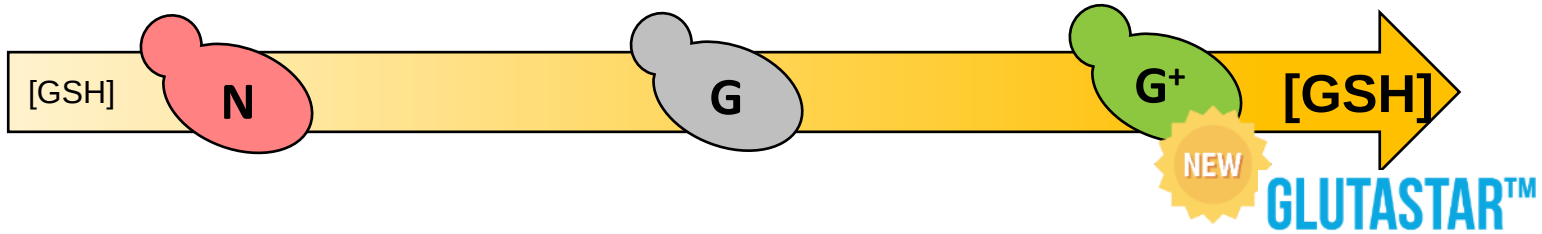
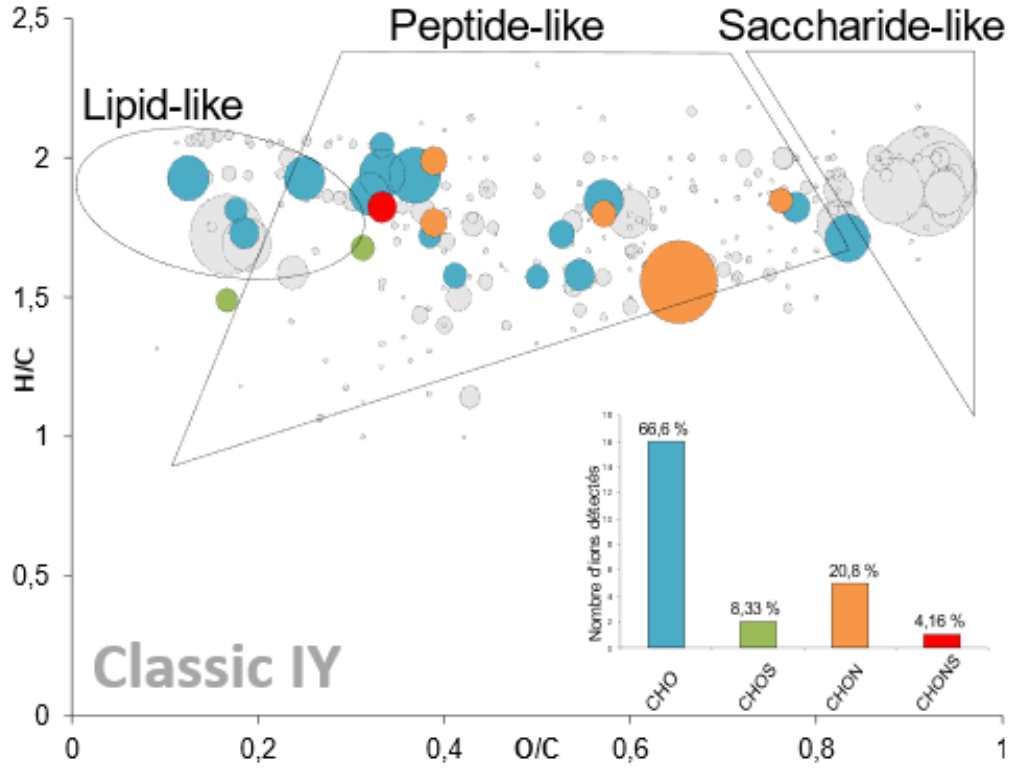


Metabolomic fingerprint

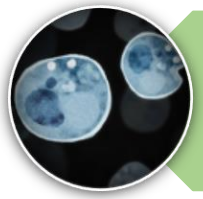
Diversity of glutathione co-accumulated compounds





- Example here with a classic inactivated yeast

Bahut *et al.*, (2020)



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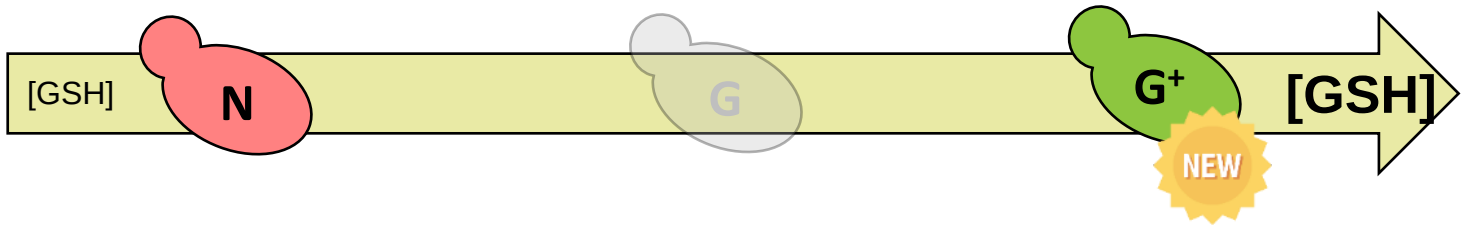
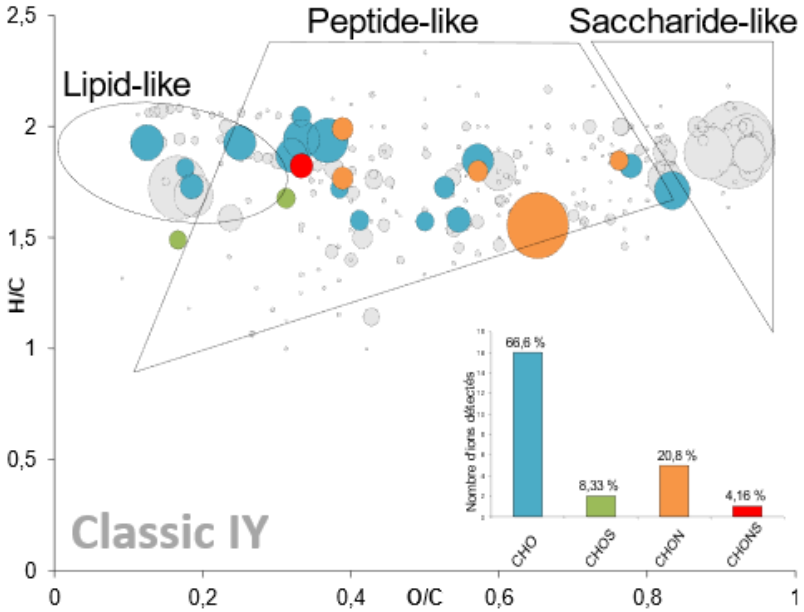
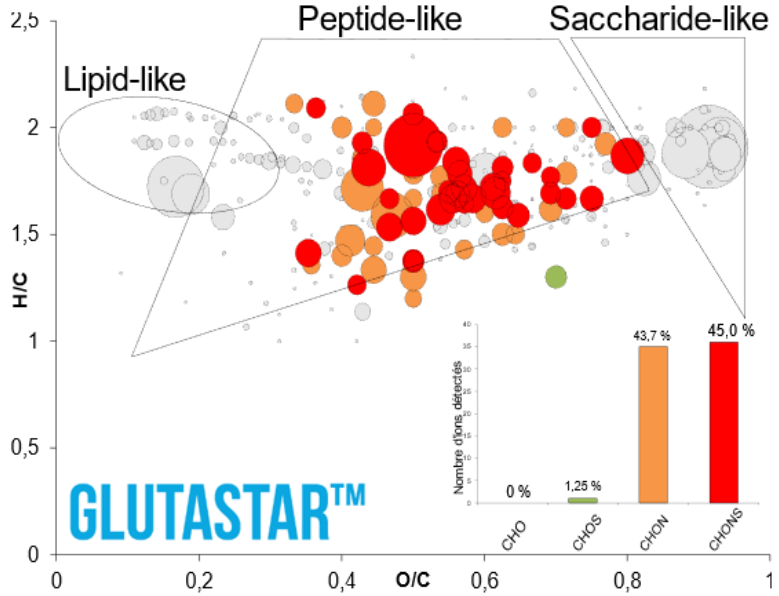






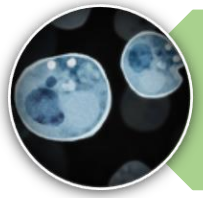
- Glutastar brings more “peptide-like” metabolites
- Higher diversity in CHONS is partially explain by a **better integration of sulfur containing amino acids in peptides**
- This abundance of **free sulfur** could **improve the nucleophilic activity of this SYD**

  ➡ **Better protection against oxydation**

Bahut *et al.*, (2020)

II) Evidence of antioxidant activity

Evaluate the antioxidant capacity of inactivated yeasts in wine like condition



Take home message

- Reduced glutathione (**GSH**) can react with quinones and **protect must and from oxidation** (preventing browning and loss of aromas)
- Beyond GSH, **other specific peptides can also have an antioxidant activity**
- **Thanks to its unique composition (GSH + other specific peptides), GLUTASTAR™ is the SYD with the highest antioxidant activity**

Antioxidant activity ⟷ **GSH + other specific peptides**

GLUTASTAR™

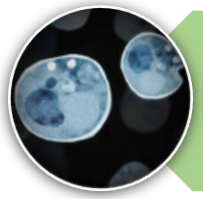
Abundance & diversity of these specific peptides

High protection of white and rosé wines against oxidation




IV) Field results

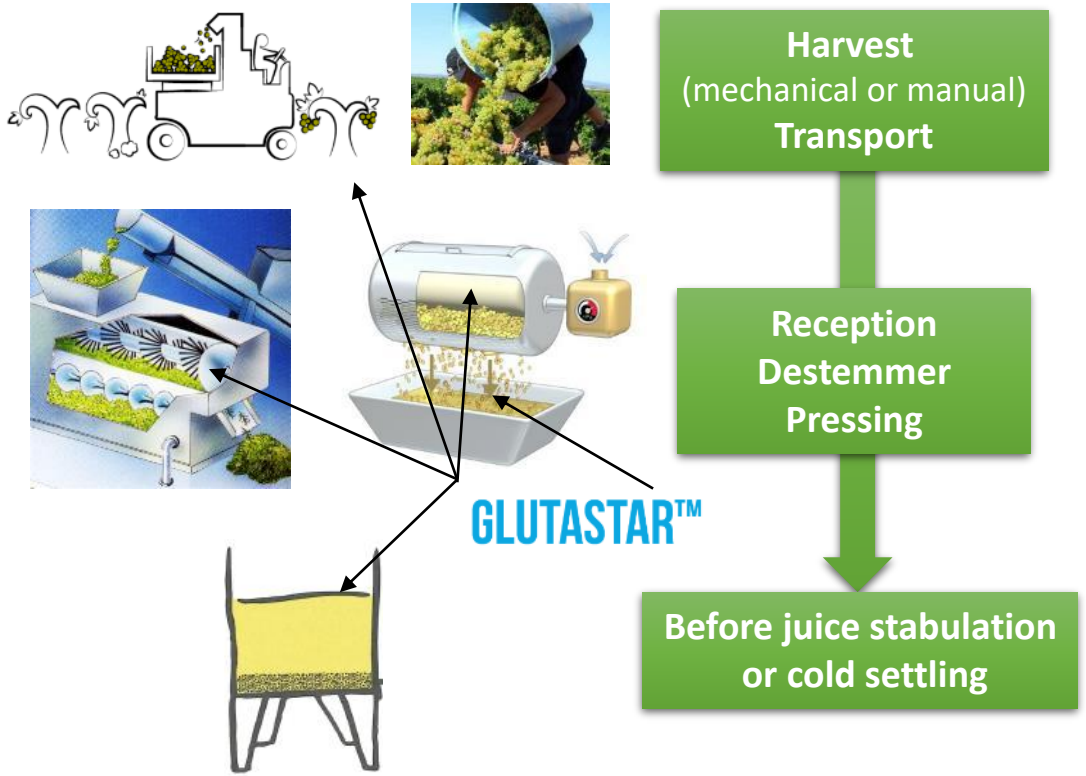
GLUTASTAR™: a high protection of white and rosé wines against oxidation

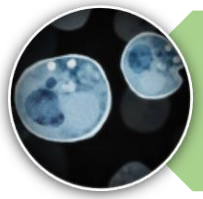


How do we use Glutastar?

- Recommended dosage: 20 to 40 g/hL
- Suspend in 10 times its weight of water or must and add to the must
- **Add at the earliest stage in winemaking process**
- **An excellent tool in the context of low SO_2 protocols**

When? At the earliest stage in winemaking process

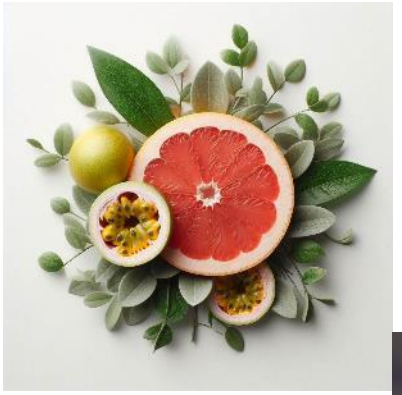


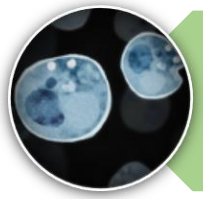


Field results

Positive impact on aromas (volatiles thiols)

- Volatile thiols: contribute to the **aromatic complexity and intensity** of the wines
- Main thiols: 3MH (grapefruit aroma), 3MHA (passion fruit) and 4MMP (boxtree aromas)
- And also: a **good marker of oxidation**!

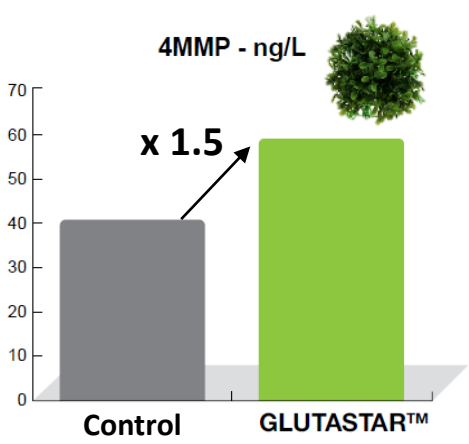


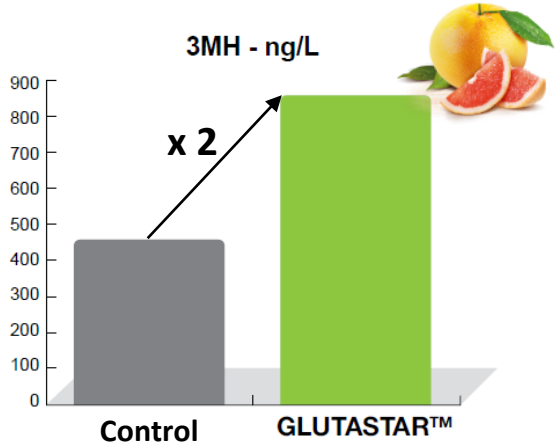


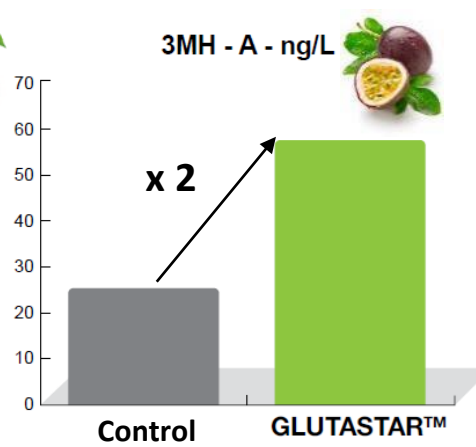
Field results

Positive impact on aromas (volatiles thiols)

Sauvignon blanc (Loire Valley, France)
Addition of 30 g/hL of GLUTASTAR on must before a prefermentative maceration (8 days at 4°C)

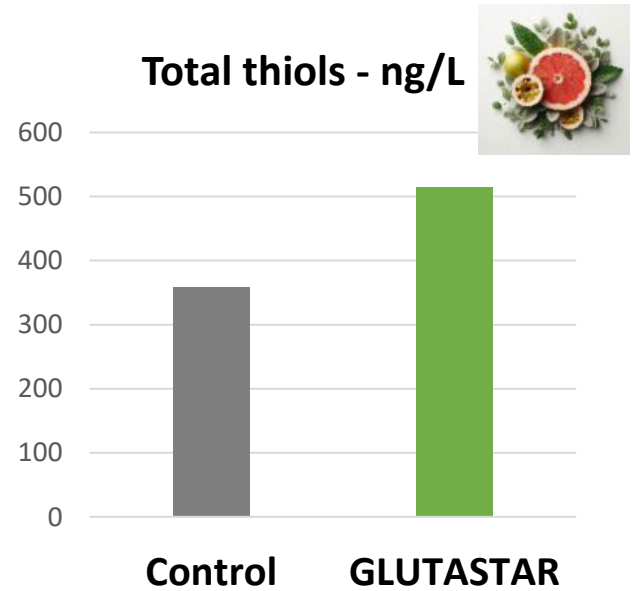






Thiols analysis in bottled wines

Sauvignon blanc (Loire Valley, France)
Addition of 30 g/hL of GLUTASTAR on the free run juice of the press



SPECIFIC YEAST DERIVATIVES

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Original by culture

Field results

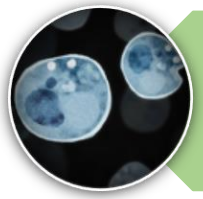
Positive impact on color in white wines

Chardonnay (California, United-States)

Addition of 30 g/hL of GLUTASTAR in the free run juice of the press

Gruner Vetliner (Austria)
Premium quality winery

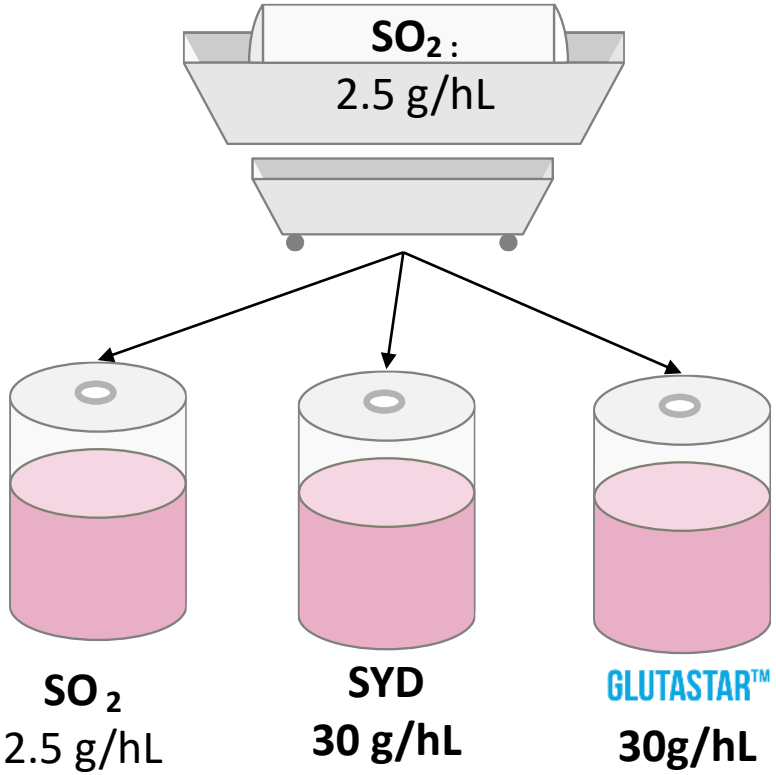
Thanks to GLUTASTAR™, we could limit oxydation and preserve the color



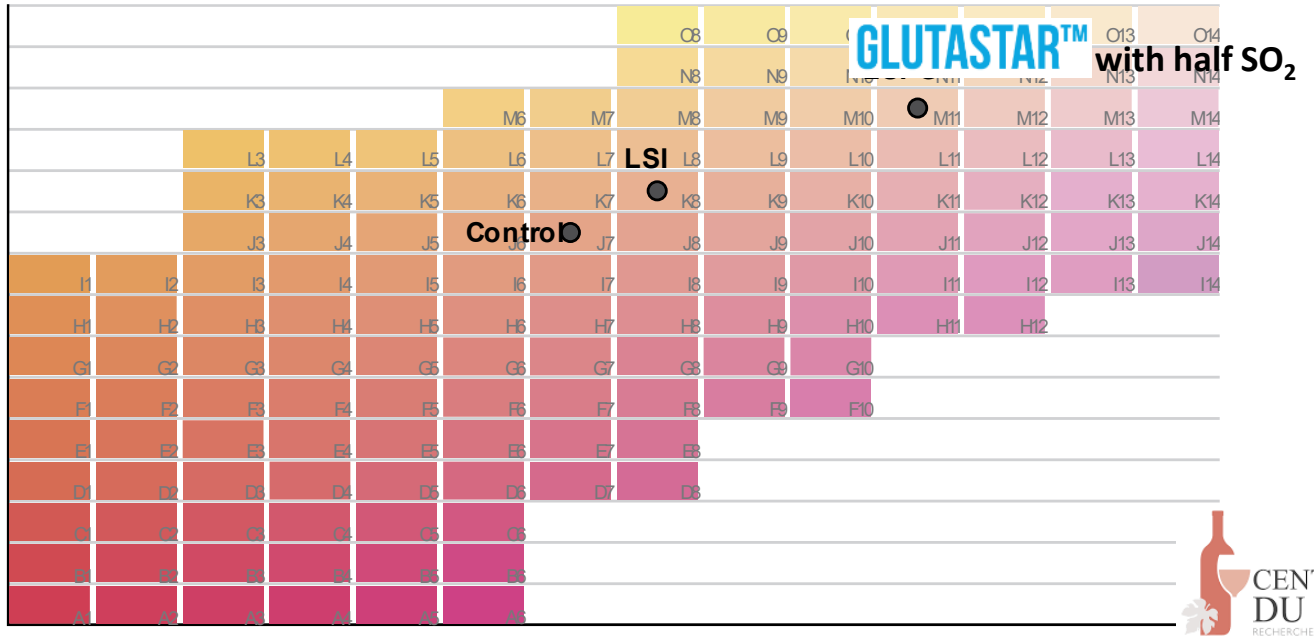
Field results

Positive impact on color in rosé wines

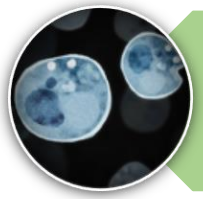
Cinsault rosé (Provence, France) - Low SO_2 protocol



Visual monitoring of the rosé wine after bottling



Thanks to GLUTASTAR™, we could divided SO_2 addition by two while preserving wine color

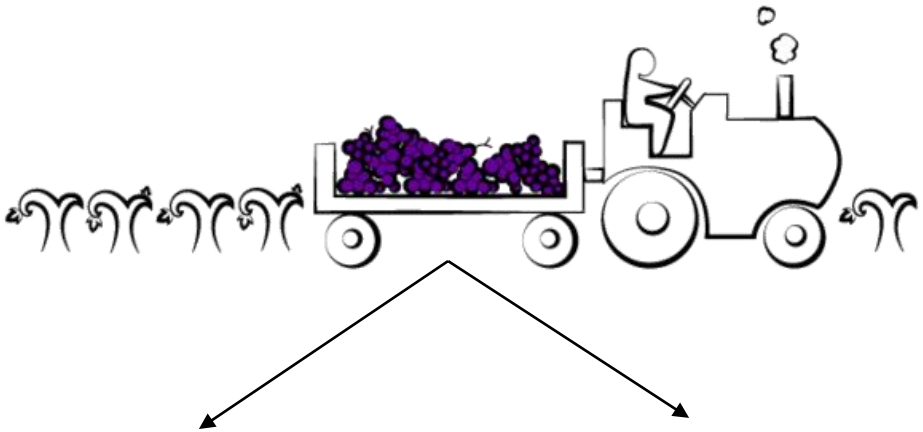


Field results

Positive impact on color in rosé wines

Grenach rosé (Provence, France) - Low SO_2 protocol

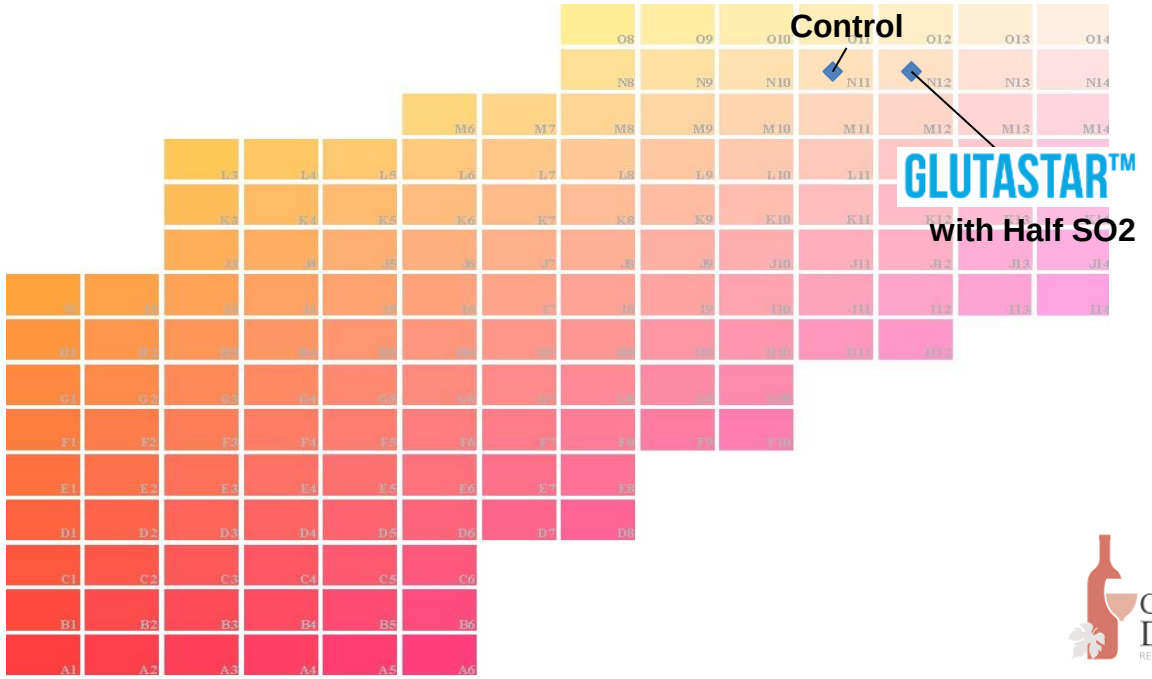
Harvesting machine & transport



5 g/hL **SO_2**

2.5 g/hL **SO_2**
+ 30 g/hL GLUTASTAR™

Visual monitoring of the rosé wine after bottling



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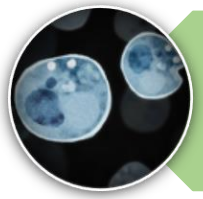


Field results

Positive impact on tasting

Chardonnay (IUVV, Burgundy, France) - Low SO_2 protocol

Manual harvest

Pressing

Settling (24h at 15°C)

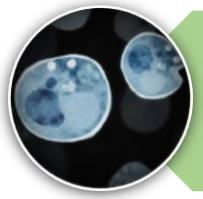
AF & MLF (1hL)

Chardonnay		
SO_2 = 2.5 g/hL **In the free run juice of the press**		
After settling		
SO_2 = 2.5 g/hL		**GLUTASTAR 30 g/hL**
25 g/hL Lalvin QA23 + 20 g/hL Fermaid O @T0 + 20 g/hL Fermaid E Blanc @1/3		
Lalvin VP41 seq. inoc		

Analysis end Alcoholic Fermentation

	Full SO_2	Half SO_2	Half SO_2 + GLUTASTAR™
TAV % v/v	11.7	11.6	11.9
G+F	**3**	**3.6**	**<1**
TA (g/L)	8.5	8.5	8.5
pH	**3.02**	**3.06**	**3.06**
VA (g/L H2SO4)	0.23	0.26	0.25
Free SO2 (mg/L)	8	7	8
Total SO2 (mg/L)	**41**	**22**	**19**

Less total SO_2 in final wines

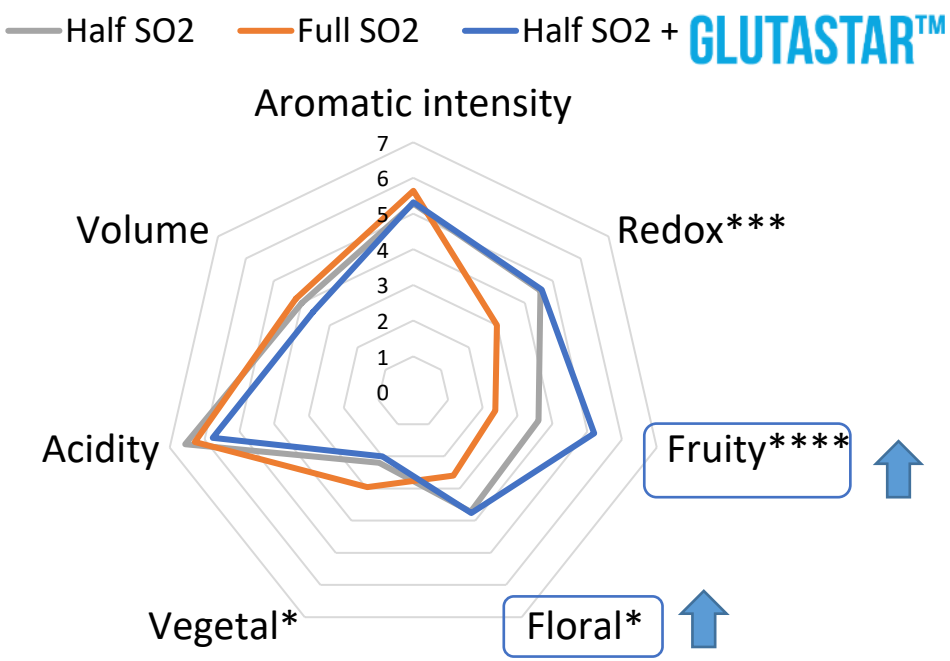


Field results

Positive impact on tasting

Chardonnay (IUVV, Burgundy, France) - Low SO_2 protocol

Sensorial analysis (IUVV, 25 tasters)

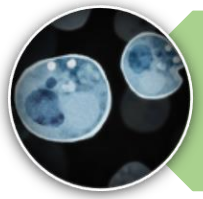


- Triangular tasting:
  3 wines significantly different
- Wine "Half SO™ + GLUTASTAR™":
  more fruity and floral notes,
  less reductive and less vegetal

Significant at
* 10% - ** 5% - *** 1% - **** 0.5%

SPECIFIC YEAST DERIVATIVES

LALLEMAND OENOLOGY
Original by culture

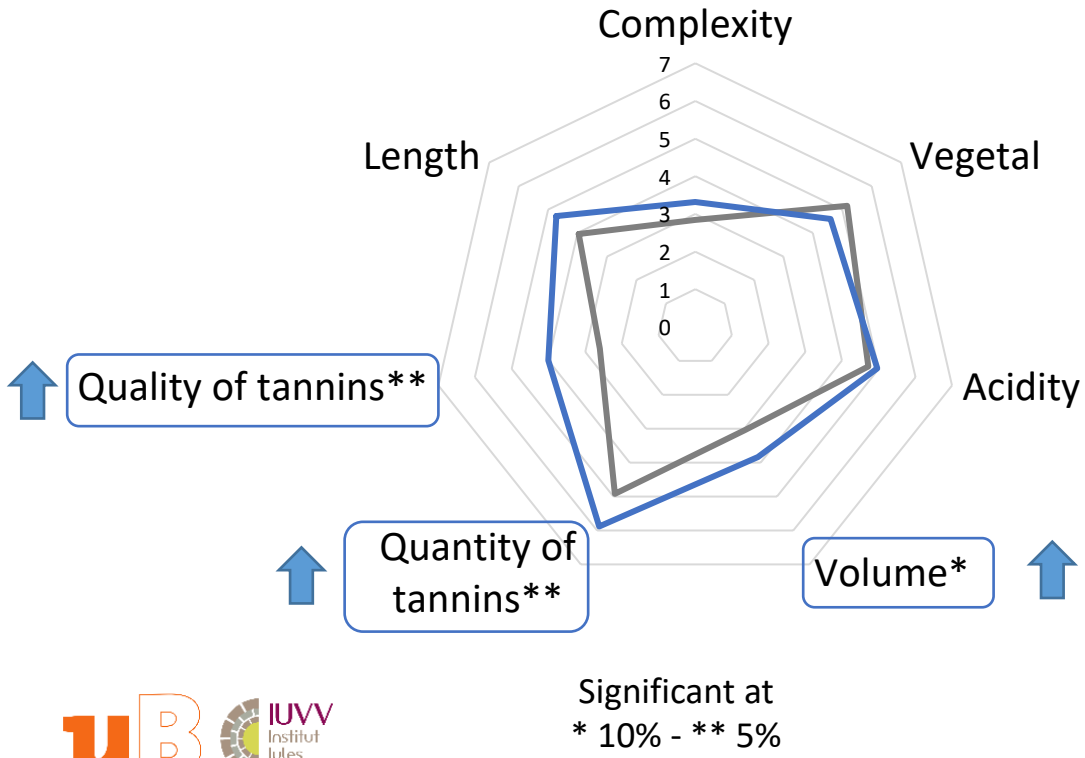


Field results

Positive impact on tasting

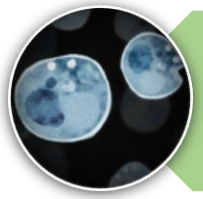
Pinot noir (IUVV, Burgundy, France)

Sensorial analysis (IUVV, 25 tasters)



Significant at
* 10% - ** 5%

- Triangular tasting:
  2 wines significantly different
- Wine "GLUTASTAR™":
  more volume, better structure with more fine tannins
- GLUTASTAR™ **also have a positive impact on red wines**



Take home message

SPECIFIC YEAST DERIVATIVES

GLUTASTAR
GET SUPREME HIGH POWER

The king of natural antioxidants

- Exclusive antioxidant peptides
- High reduced glutathione
- Contributes polysaccharides

Prevents oxidation

- Blocks free radicals
- Reduces risk of browning

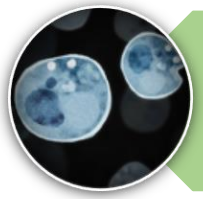
Wines of higher quality

- Wines with more intensity and complexity
- More volatile thiols
- Stability of esters
- More color stability

Recommended from prefermentative stages

- Effective in must
- Cold storage on solids
- Low/no sulfur winemaking

LALLEMAND
LALLEMAND OENOLOGY
Original by culture



Glutastar: part of a fresh and Aromatic white winemaking protocol

SPECIFIC YEAST DERIVATIVES

Ensure the alcoholic fermentation and **drive the sensorial profile of your wines** with a dedicated protocol

Prefermentative stages

GLUTASTAR™

Alcoholic fermentation

Selected wine yeast & Protection

GO-FERM™ STEROL FLASH

SAUVY™

Alcoholic fermentation

Yeast nutrients

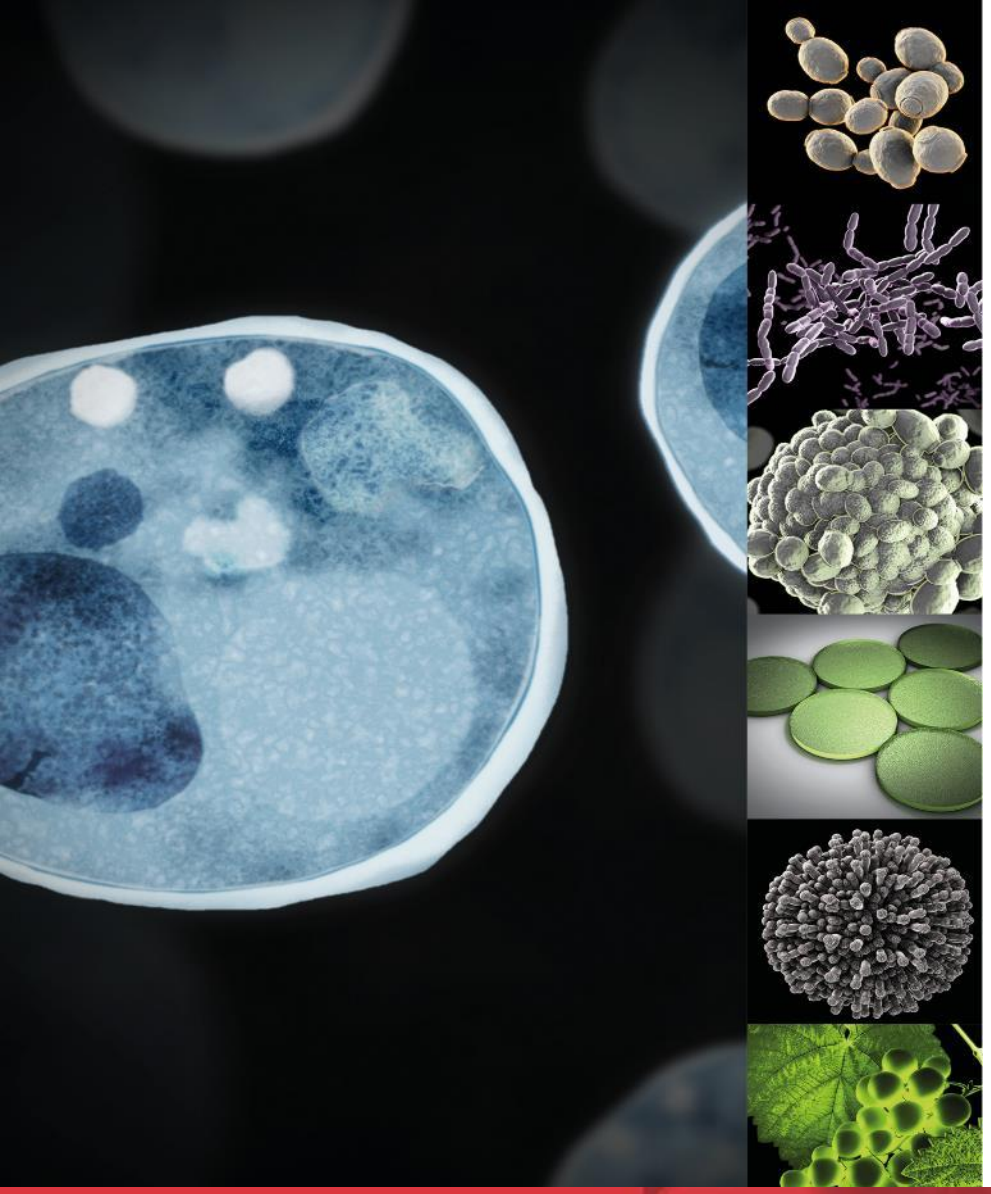
FERMAID O™

Stimula™ Sauvignon blanc

LALLEMAND

LALLEMAND OENOLOGY

Original by culture



Thanks! Merci!

Marion BASTIEN

Technical team & Valorization

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