



MICROBES MANAGEMENT IN WINEMAKING

EGLANTINE CHAUFFOUR - ENARTIS USA





WEBINAR INFORMATION

- 35 minute presentation + 10 minute Q&A
- Save Qs until the end of the presentation
- Use chat box for audio/connection issues or go on <https://support.webinato.com/support/home>
- Recording in progress
- Poll questions

MAIN WINE SPOILAGE MICROBES

ACETIC ACID BACTERIA (Acetobacter, Gluconobacter)

- VA, Acetic acid, ethyl acetate

LACTIC ACID BACTERIA (Lactobacillus, Pediococcus, Oenococcus)

- VA, Acetic acid, Volatile phenols, Diacetyl, Mousiness, Ropiness, Biogenic amines

BRETTANOMYCES SPP.

- VA, Volatile phenols, Isovaleric acid

OTHER NON-SACCHAROMYCES

- VA, Acetic acid, Aldehydes, Ethyl acetate

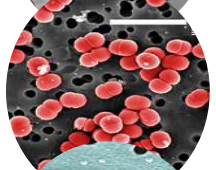
Acetobacter



Lactobacillus



Pediococcus



Oenococcus



Brettanomyces





WHY MANAGE MICROBIAL ACTIVITY IN WINE?

Visual Defects

Stuck
fermentation

SO₂ binding
molecules

Acetic Acid

Acetaldehyde

Ethyl Acetate

Sulfides

Volatile phenols

Isovaleric acid

Diacetyl

Mousiness

Biogenic amines



SULFIDES: PREVENTION / TREATMENTS

Prevention

- Juice fining
- Fermentation management
- Low H₂S producer yeast
- Limit reductive lees ageing

Treatments

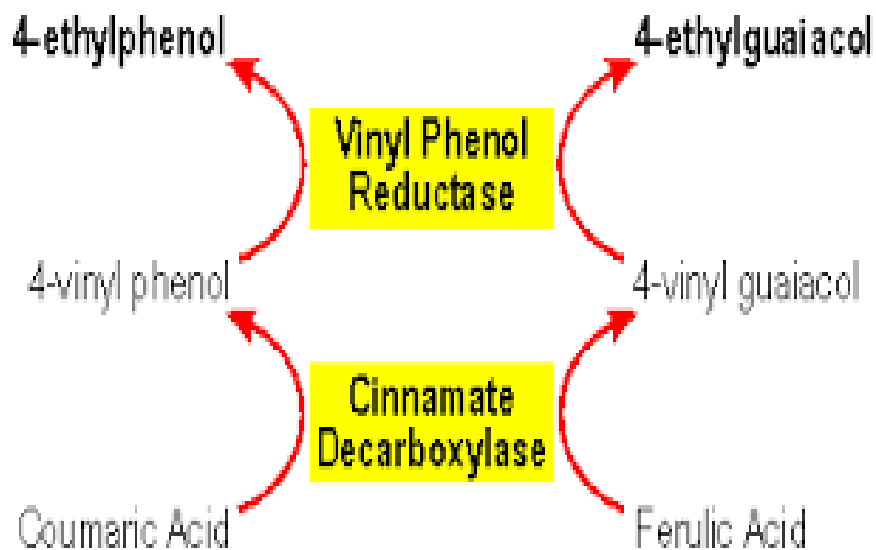
- Aeration?
- Cu fining
- Tannin addition
- SO₂, AA, Cu



Volatile phenols: 4-EP, 4-EG

Isovaleric acid

- **When?** End fermentation, oak ageing, bottling



LACTIC ACID BACTERIA TAINT



Mousiness = ACTPY, ETPY, ACPY

- 2-acetyltetrahydropyridine (ACTPY), 2-ethyltetrahydropyridine (ETPY) and 2-acetylpyrroline (ACPY)
- **How?** In the presence of Lysine and ethanol



Biogenic amines = Cadaverine, Putrescine, Histamine,...

- **How?** Enzymatic decarboxylation of amino acids such as Lysine, Ornithine, Histidine



Geranium = 2-ethoxyhexa-3,5-diene

- **How?** Metabolism of sorbic acid (potassium sorbate)



FIXING WINE FAULTS

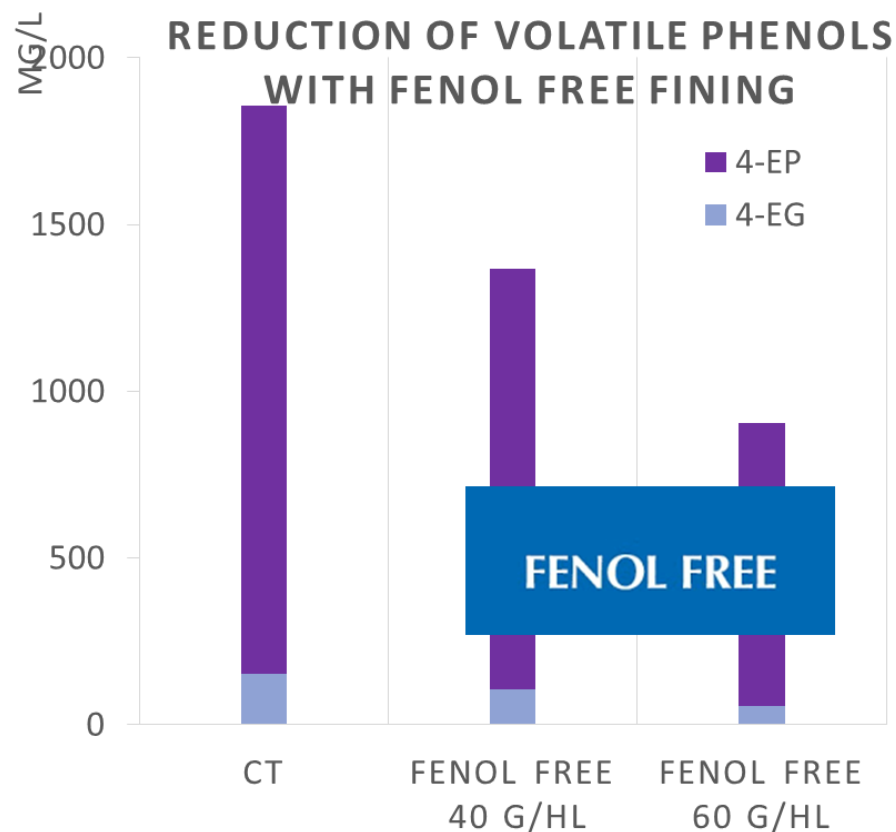
SO₂

Fining

RO

Enzyme (β -glucanase)

Blending





VINOQUIRY

LABORATORIES

by **enartis** **USA**

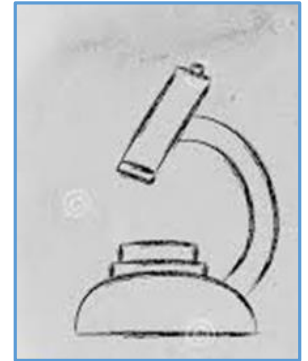
DETECTION: THE KEY OF PREVENTION

Sampling!

HOW TO DETECT MICROBES?

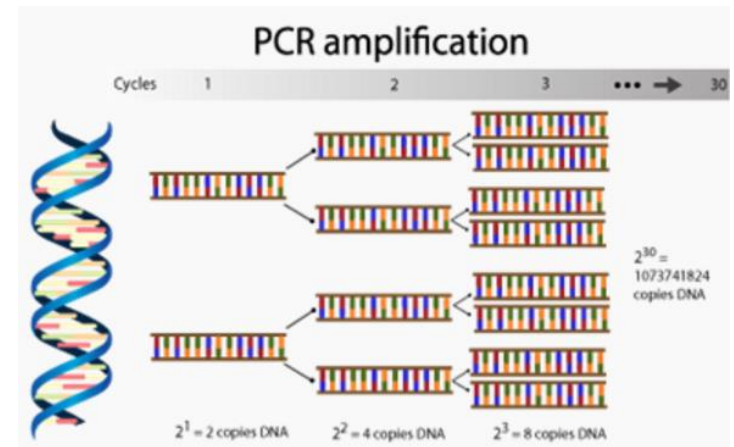
Detection of microbes = PREVENTION

- Microscope observation
- Plating
- PCR Panel
- Hygiene Control



Monitoring

- pH, VA, FSO₂, 4-EP, 4-EG, tasting
- Every 2 months or monthly
- Monthly QC Panel
- Brett Assessment Panel



PROS AND CONS



PROS

- Fast
- Easy
- Low cost

- Examine vitality
- Specific groups
- Low cost

- Highly specific
- Sensitive
- Accurate
- Detect DNA
- Detect VNC
- Rapid

CONS

- Not specific
- Requires lots of cells
- Live/Dead differentiation

- Overgrowth of fungi = false results
- ~ 7 days
- Not specific
- VNC cells not detected

- Might detect dead cells
- Cost



THE PROPER USE OF ANTIMICROBIAL AGENTS



ANTIMICROBIAL AGENTS AVAILABLE IN WINEMAKING

Molecular $\text{SO}_2 > 0.6\text{-}0.8$ ppm

- INHIBITING



DMDC (Velcorin)

- MAINLY YEAST

Lysosyme : Enartis Zym Lyso

- ONLY LACTIC ACID BACTERIA

Chitosan: Enartis Stab Micro/Enartis Stab Micro M

- WIDE ANTIMICROBIAL SPECTRUM

MOLECULAR SO₂...

Distribution of free SO₂ at various pH's

*Free SO₂ needed to achieve
molecular SO₂ of:*

pH	%SO ₂	%HSO ₃ ⁻	%SO ₃	0.8 ppm	0.5 ppm
2.90	7.5	92.5	0.009	1 ppm free	7 ppm free
2.95	6.6			12	7
3.00	6.1	93.9	0.012	13	8
3.05	5.3			15	9
3.10	4.9	95.1	0.015	16	10
3.15	4.3			19	12
3.20	3.9	96.1	0.019	21	13
3.25	3.4			23	15
3.30	3.1	96.8	0.024	26	16
3.35	2.7			29	18
3.40	2.5	97.5	0.030	32	20
3.45	2.2			37	23
3.50	2.0	98.0	0.038	40	25
3.55	1.8			46	29
3.60	1.6	98.4	0.048	50	31
3.65	1.4			57	36
3.70	1.3	98.7	0.061	63	39
3.75	1.1			72	45
3.80	1.0	98.9	.077	79	49
3.85	0.9			91	57
3.90	0.8	99.1	0.097	99	62
3.95	0.7			114	71
4.00	0.7	99.2	0.122	125	78



CHITOSAN

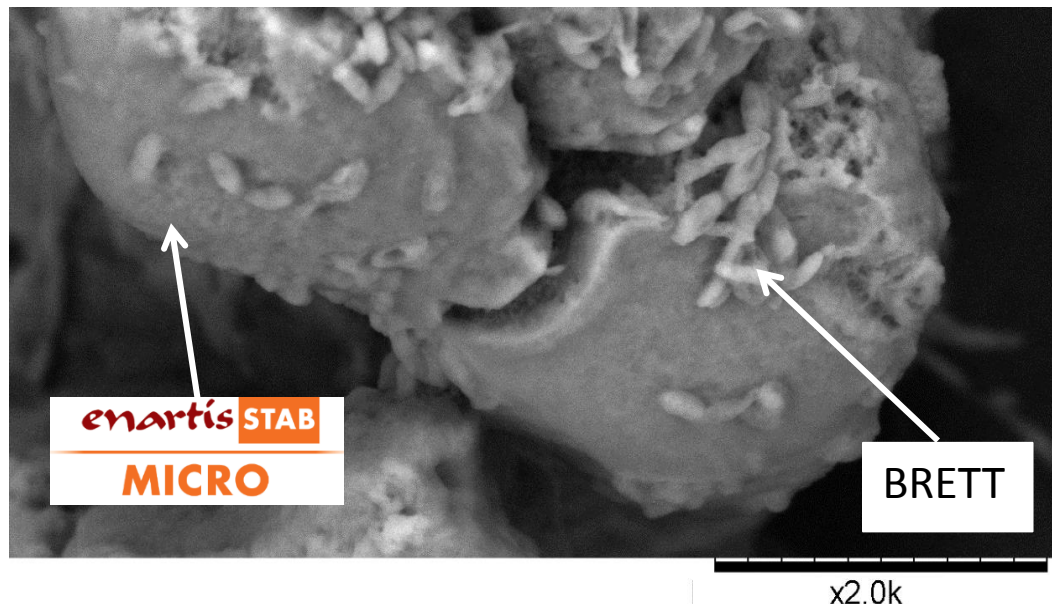
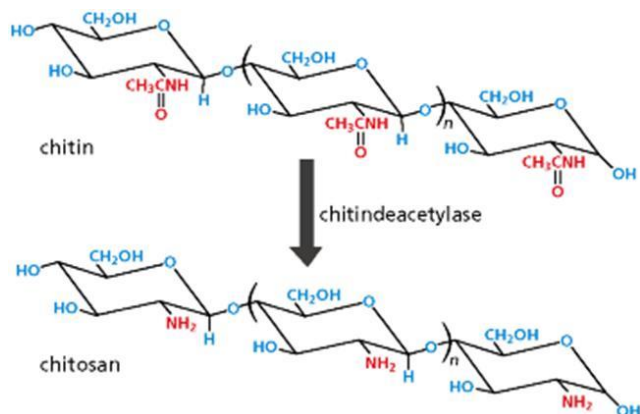
Chitosan: De-acetylation of chitin, polysaccharide derived from *Aspergillus niger*

enartis **STAB**
MICRO M

Enartis Stab Micro (M) : **Pre-activated** chitosan, higher charge, higher contact surface, higher efficiency + yeast hulls

enartis **STAB**
MICRO

Enartis Stab Micro : **Pre-activated** chitosan, higher charge, higher contact surface, higher efficiency

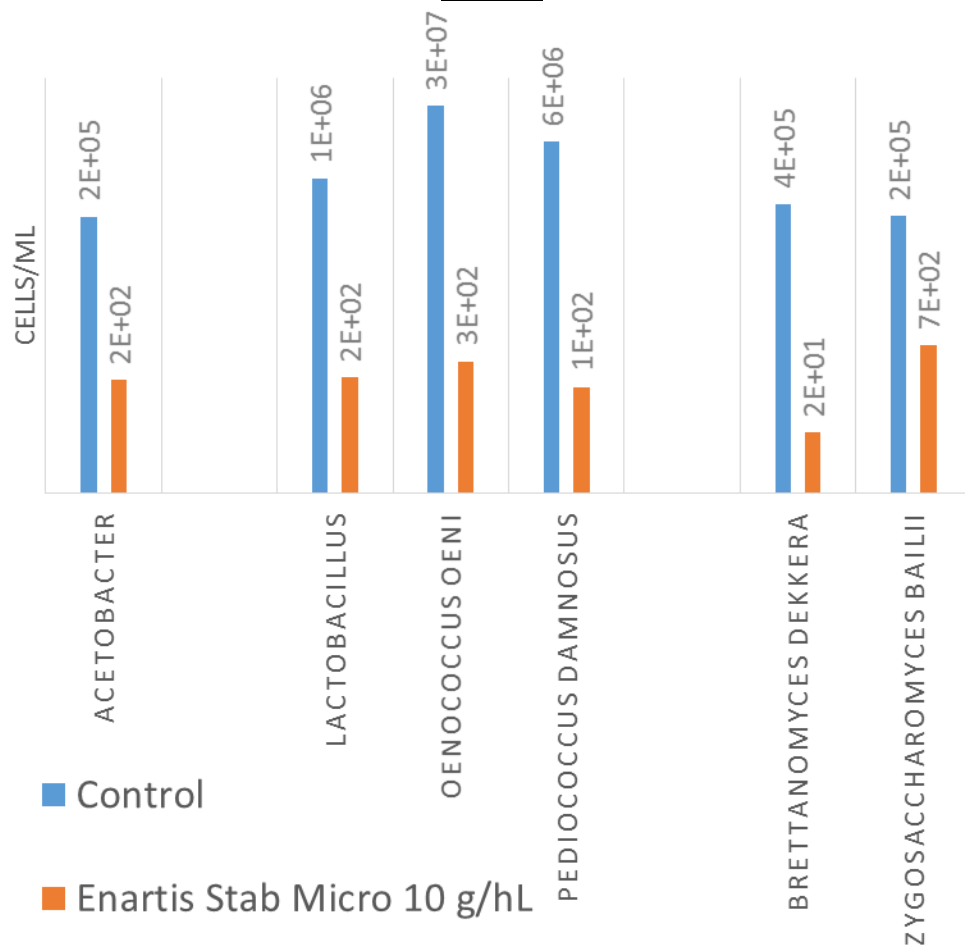




WIDE SPECTRUM ANTIMICROBIAL

WIDE SPECTRUM ANTIMICROBIAL AT ANY

TIME



Action on:

Acetobacter, Lactobacillus, Pediococcus, Oenococcus, Brettanomyces, Zygosaccharomyces and some other non-*Saccharomyces* yeast

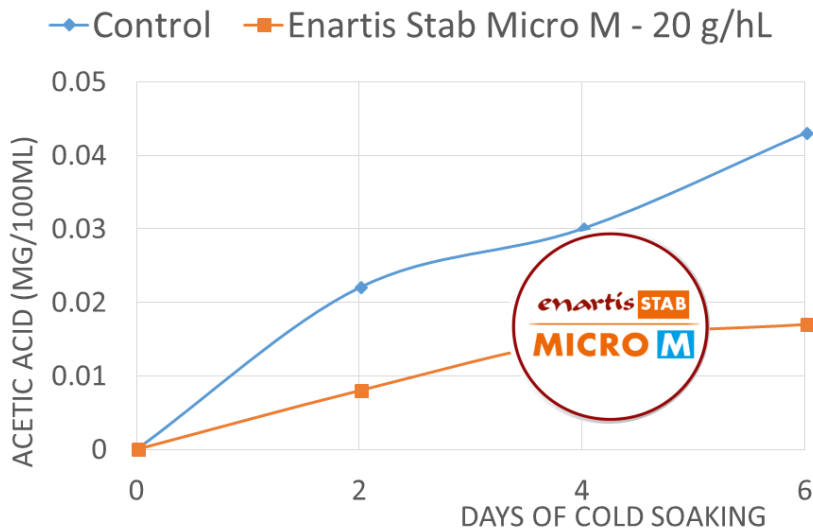
Dosage:

- 10-20 g/hL followed by racking to reduce high populations of microbes
- 3-4 g/hL to eliminate small populations before they become spoilage
- Alternative to SO₂ for antimicrobial control



CONTROL FERMENTATIONS AND VA PRODUCTION

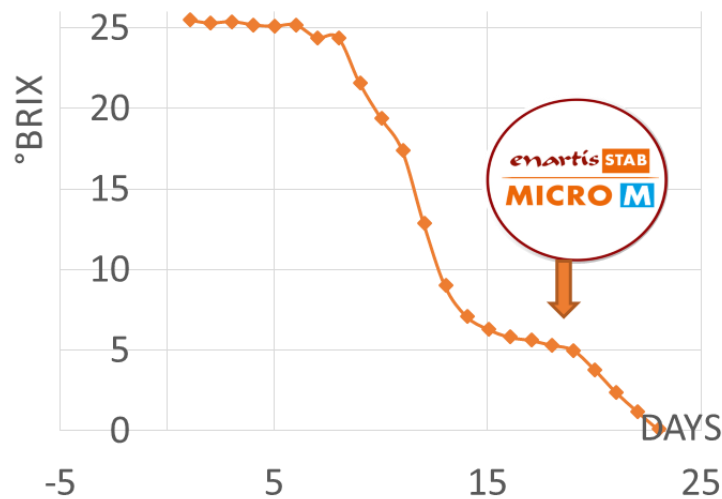
PREVENT VA PRODUCTION DURING COLD SOAK AND GRAPE TRANSPORT



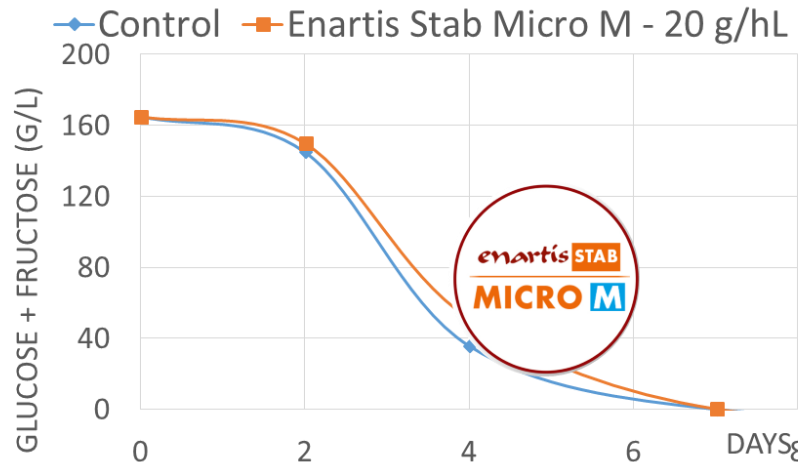
REMOVE FILM YEAST

NO IMPACT ON SACCHAROMYCES FERMENTATION

LIMIT STUCK FERMENTATIONS ALCOHOLIC FERMENTATION



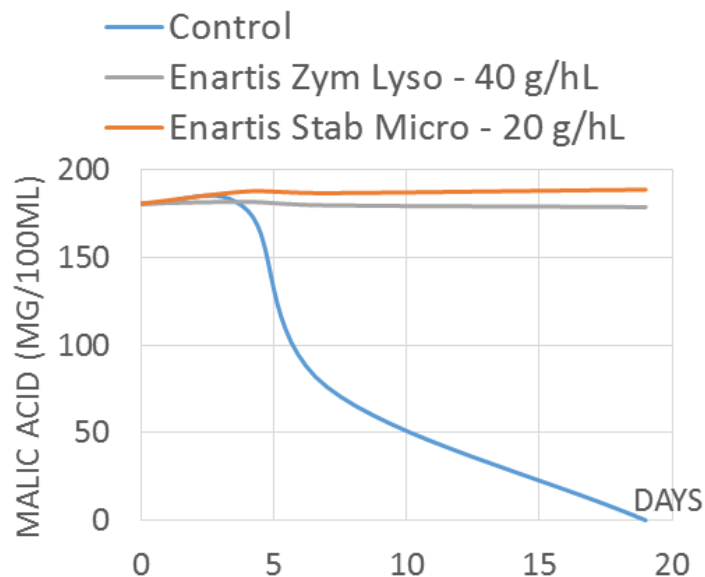
ALCOHOLIC FERMENTATION





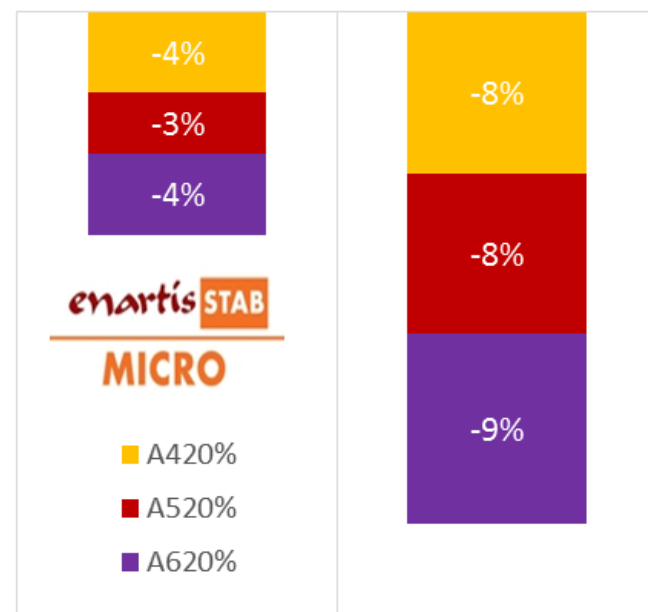
ALTERNATIVE TO LYSOZYME

CONTROL MLF / ALLERGEN-FREE ALTERNATIVE TO LYSOZYME



ENARTIS STAB
MICRO, 20 G/HL

LYSOZYME, 20
G/HL



No impact on protein stability

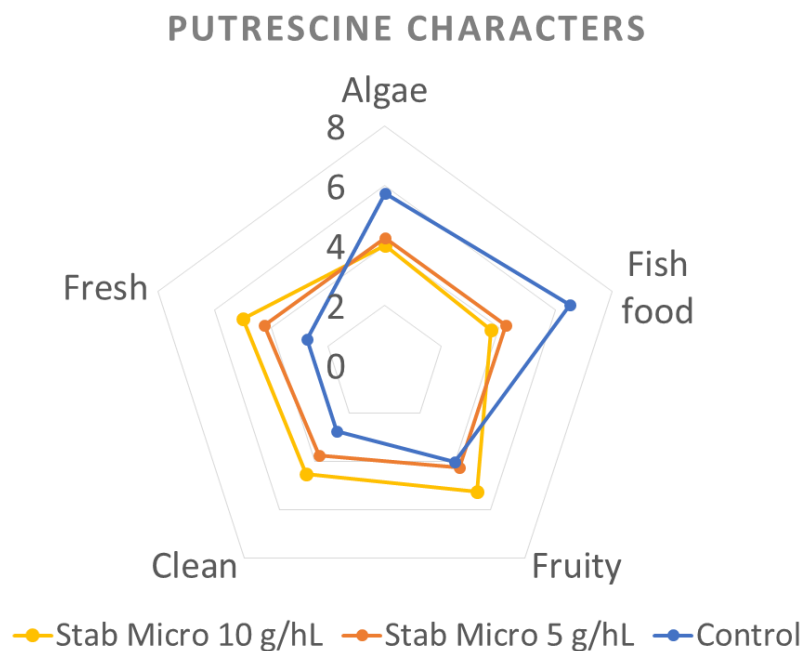
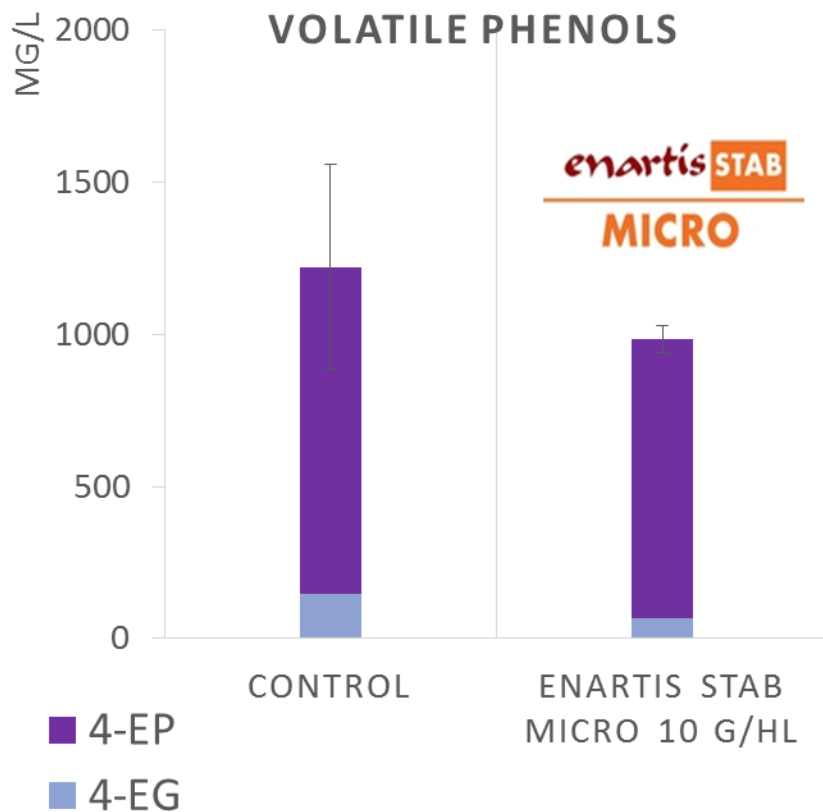
No interference with colloidal stability

Low impact on color

Dosage: 5 g/hL to prevent MLF / 10 g/hL to delay MLF / 20 g/hL to stop MLF



REMOVE OFF-FLAVORS





APPLICATIONS

Prevent spoilage
microorganisms
2-3 g/hL every
racking

Remove spoilage
microorganisms
10-20 g/hL

Prevent VA during
cold soak or grape
transport
5-20 g/hL

Promote clean and
safe fermentation
5 g/hL

Improve native
fermentation take off

Limit stuck
fermentation
5-10 g/hL

Control MLF
5-10 g/hL

**Vegan and allergen-
free** alternative to
lysozyme and SO₂

Remove off-flavors



WHEN TO USE WHICH ANTIMICROBIAL?

	pH, SO ₂ , T°	Enartis Zym Lyso	Enartis Stab Micro M	Enartis Stab Micro	Filtration
Harvest Crush	X	X	X		
Fermentation		X	X		
Malolactic Fermentation		X	X	X	
Barrel Aging	X	X		X	X
Bottling	X	X		X	X



SOME TIPS FOR PREVENTION

Good cellar hygiene

Monitor critical parameters through entire winemaking process (VA, FSO₂, microscan)

Early detection = prevention = analysis

Use Antimicrobial up front

Fermentation Management (yeast needs)

Manage pH

Check/Taste the lees before lees ageing



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THANK YOU FOR
YOUR ATTENTION

