Anchor
OENOLOGY
Supporting you from grape to glass

THE ANCHOR ***FERMENTATION*** AND ***FINISHING*** GUIDE 2019

THE ANCHOR FERMENTATION AND FINISHING GUIDE

What is refresh?

verb

give new strength or energy, to reinvigorate

synonyms: revitalize, revive, restore, fortify, strengthen, enliven, stimulate, freshen, energize and renew

This year we are focusing on the act of refreshment. Refreshing the brand, the look and feel, the products and our message to the industry. In a matter of four years, Anchor Yeast as a company will hit the centennial milestone. The question is, how do you stay relevant, updated and present after so many years? By constantly evolving, reinventing and strengthening the brand and product offering.

Last year saw us going back to the basics, launching the brand new Anchor Oenology division and our core motto going forward: being here for you and supporting you from the grape, right through to the final wine stage. In 2019, we are building on this core message by launching our brand new packaging, with both the yeast and bacteria turning over a new leaf. We are proud to share our refreshed, energized and renewed yeast ranges: EXOTICS, now a range of two products, the trusted ALCHEMY blends and the newly positioned, but faithful, blue pack range that have been handed down through generations of winemakers, now proudly known as the LEGACY range. Rubbing shoulders with the refreshed, premium yeast packaging, is the new bacteria: new look, new name, but with the same premium, quality enhancing bacteria blends inside.

As South Africa is the home of Anchor Oenology, we felt it only apt that the brand new packaging makes its way into the industry here first, where it all started 44 years ago. This harvest season you will see a transition from our old packaging to our new image, underwriting the core values of Anchor Oenology: premium quality, innovation and reliability.

EXOTICS

[(ĭg-zŏt'ĭk): intriguingly unusual, original & exciting]

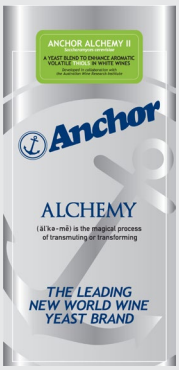
ALCHEMY

[(ăl'kə-mē): is the magical process of transmuting or transforming]

LEGACY

[('lɛgəsi): something handed down from one generation to the next]

For the last couple of years, you have been used to seeing our yeast products in this packaging. We felt it was time to evolve the packaging to fit with our purpose in the industry: to provide premium products for quality wine production. Turn over the page for the new Anchor Oenology yeast and bacteria offering...



Anchor OENOLOGY

Supporting you from grape to glass

THE EXOTICS RANGE:

Not only does the name Exotics now refer to a range of products, it also represents iconic wines created with interesting interspecies yeast hybrids. Previously known as Exotics SPH, we are proud to introduce you to the newly named Exotics MOSAIC. In the same way that a mosaic consists of multi-faceted, complex parts that come together to form one beautiful image, this yeast is responsible for creating complex, beautiful wines that grow into their profiles over many years of ageing.

Joining this family, is the brand new Exotics NOVELLO. Another interspecies hybrid, this time responsible for the production of soft, elegant, fresh and fruity wines of the highest quality. Novello means fresh, young and exciting, exactly the feelings invoked by tasting the wines produced with this new hybrid. Read more about this new product in the YEAST chapter.

THE ALCHEMY RANGE:

The yeast blends we trust, the yeast blends we love, now with a brand new look. This range now consists of two blends for white wine production and two blends for red wine production. If you are looking for intensely aromatic and complex wines, these yeast blends are scientifically formulated to work in synergy to create exceptional wines.

THE LEGACY RANGE:

We re-introduce you to the backbone of the Anchor yeast family. The reliable, dependable, trustworthy legends that make up the newly branded LEGACY range. There are some familiar faces with a new look, paying homage to the quality and robustness that these strains are renowned for worldwide. What better way to honour the Anchor legacy than by refreshing and reinvigorating the strains that have been here for generations of winemakers.

THE DUET RANGE:

In order to support the quality alcoholic fermentations you have come to expect from all the products in our yeast portfolio, we would also like to introduce you to the refreshed, in name and appearance, Anchor DUET bacteria portfolio.

This DUET range is the new home of the familiar and well-known *Oenococcus oeni/Lactobacillus plantarum* bacteria blends in the Anchor portfolio, specifically developed for co-inoculation (a duet of alcoholic and malolactic fermentations). This range will soon be complimented with the SOLO range of bacteria for sequential malolactic fermentation.

The Anchor Duet AROM bacteria blend (previously known as the Anchor Co-Inoculant Bacteria), is specifically developed to enhance the aroma profile during malolactic fermentation. The newly named Anchor Duet SOFT (previously known as Anchor Co-Inoculant Bacteria 3.2), increases the softness and decreases greenness and astringency during malolactic fermentation. These bacteria blends are focused on enhancing the quality, aroma and sensory perception of red and white wines during malolactic fermentation. You can read more about these two products in the BACTERIA chapter.

In order to make a clear connection between our unique bacteria blends and their sensory impact in wine, we have decided to rebrand our bacteria, creating new names and a new look. Now the quality enhancing effect is clear.

Anchor Duet AROM
(previously known as the
Anchor Co-Inoculant Bacteria)

Anchor Duet SOFT
(previously known as the
Anchor Co-Inoculant Bacteria 3.2)

This year, Anchor Oenology is bringing you renewed, refreshed and energised products, people and support. We are ready to support you from grape to glass in the 2019 harvest season and beyond.

GETTING TO KNOW THE ANCHOR TEAM

With the 2019 edition of the Guide, we would like to introduce the team and their plans for a refreshed 2019...

Director of Anchor Oenology: Danie Malherbe — dmalherbe@anchor.co.za / 060 660 6360

2018 was a challenging year due to my new career path, but resulted in personal growth and development. I hope to start fresh in 2019 by balancing work and family, spending some more quality time with the wife and boys and of course...some time on the Katoom!

International Product Manager: Elda Lerm — elerm@anchor.co.za / 082 903 0694

Looking back on what was in 2018, I am hoping to go into 2019 refreshed and energised by focusing on the following: spending quality time where it matters the most, travelling more for fun, learning a new language and spending more weekends recharging by the beach with a soft-serve ice-cream....with a flake!

Technical Sales Manager: Mmule Masalesa — mmasalesa@anchor.co.za / 082 882 3539

I am hoping for a newly energised version of myself in 2019, by dusting off my running shoes and getting back on the road on a regular basis. I would love to take part in a motorcycle race and visit Tianmen Mountain. And of course, like every woman, eat more and not gain weight! My goal is to spend more time with my beloved family, be happy, be more crazy! Life is way too short!

Technical Sales Manager: Praisy Dlamini — pdlamini@anchor.co.za / 082 907 0171

It's probably a cliché, but in 2019 I want to just be happy, eat pasta in Italy and see Disney World with my inquisitive son. I would love to do more activities with him and indulge my inner child by being more adventurous and carefree. I would love to refresh my studies and become a Cape Wine Master.

Technical Sales Manager: Lauren Behrens — lbehrens@anchor.co.za / 082 426 1369

My motto for 2019 is to count my blessings and live every day to the fullest. As part of refreshing and building on 2018, I want to learn something new, read a different book and watch a movie that wouldn't normally be my first choice. I am hoping to grow and refresh by pushing myself to eat something strange for the first time and to travel to a new destination!

Technical Sales Manager: Julie de Klerk — jdeklerk@anchor.co.za / 082 943 0651

2019 will be all about something old and something new. Same products, same clients, but I will be doing my new job in a new environment with new colleagues. Our house needs a bit of refreshing as well and will go through major renovations and I will fight my old nightmare - learning Afrikaans! And after being a mom to a baby boy, I will discover what it is to have a daughter in March... 2019 is going to be as refreshing as a glass of bubbly!

Office Administrator and Personal Assistant: Elicia Wethmar — ewethmar@anchor.co.za / 021 534 1351

No more studies mean more me-time, doing the things I love. 2019 is a fresh start with more time to read some books and getting back to my hobbies, maybe even start some new ones. I am definitely getting back on a horse at least once a month and doing some fun-runs with my husband: 2019 is about me, myself and I.

Product Planning and Quality Assurance Manager: Farieda Safudien — fsafudien@anchor.co.za / 021 534 1351

I would love to refresh my eating and exercise habits in 2019, making healthier choices. On my bucket list is to create a bucket list, as well as learn Arabic and do some more travelling, seeing countries like Turkey and Palestine. My children might be all grown up, but spending more time with them in the New Year, will be a priority.

Orders and Deliveries: Sebastian Petersen — spetersen@anchor.co.za / 021 534 1351

In order to stay refreshed and energised in 2019, I would like to keep fit, do the Cape Town Marathon and start playing tennis. This year I want to do something instead of killing time and go at 2019 with the mantra of positive mind, positive life!

ORDERS, DELIVERIES AND TECHNICAL SUPPORT

Send your order to Elicia, Sebastian or your Technical Sales Manager.

Share/send your order form (including your order number and preferred delivery date) via:
Telephone: 021 534 1351 or Email: oenology@anchor.co.za

WHEN DOES IT GET DELIVERED?

- Tuesdays
- Thursdays
- Every second Friday
- Daily: Other major areas
- Twice per season

EMERGENCY DELIVERIES:

Speak to the Technical Sales Manager in your area.

CONSULTANT / AREAS

Mmule Masalesa	Praisy Dlamini	Lauren Behrens	Julie de Klerk
Orange River	Midlands	Olifants River	IOC Product Range
Worcester	Southern Cape	Stellenbosch	Method Cap Classique enquiries
Algoa	Cape Peninsula	Garden Route	and support
Klein Karoo	Overberg	Franschhoek	
Breedekloof	Durbanville	Helderberg	
Robertson	Paarl		
Tulbagh	Swartland		
	Johannesburg		

ACCOUNT DETAILS

Name	RYMCO (PTY) LTD T/A ANCHOR YEAST
Bank	Nedbank
Branch	Industria
Branch code	198765
Account type	Current
Account number	196-328-3910
Reference (account holders)	Account number starting with SA
Reference (COD customers)	Invoice number (delivery after proof of payment)
Payment terms (account holders)	30 days from account statement

THE FINE PRINT

- Open an account before the harvest season to allow adequate time for a credit check.
- No unused product will be taken back after the season.
- Products have adequate shelf-life if stored correctly.
- For all certification and documentation, contact your Technical Sales Manager.

ANCHOR S.O.S TRUCK FOR EMERGENCY DELIVERIES

We want to make it possible for you to get the product you need... when you need it most!

A special truck will be armed with all your favourite Anchor products, driven by the man with the smile, Patrick Khumalo.

WE ARE BRINGING PRODUCTS RIGHT TO YOUR DOORSTEP! WE ARE HERE FOR YOU!

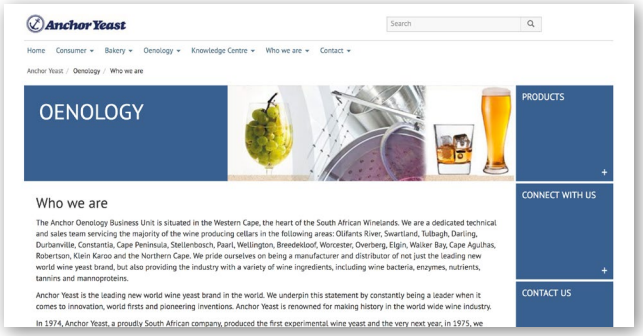
Normal terms and conditions apply for all account holders, otherwise COD.

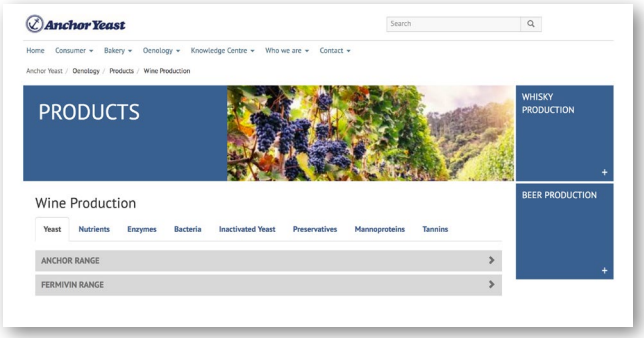
Patrick Khumalo:
079 541 0319

THE ANCHOR OENOLOGY WEBSITE

We have a new website, now with the datasheets of all your favourite products.

Find our website at: **www.anchor.co.za**





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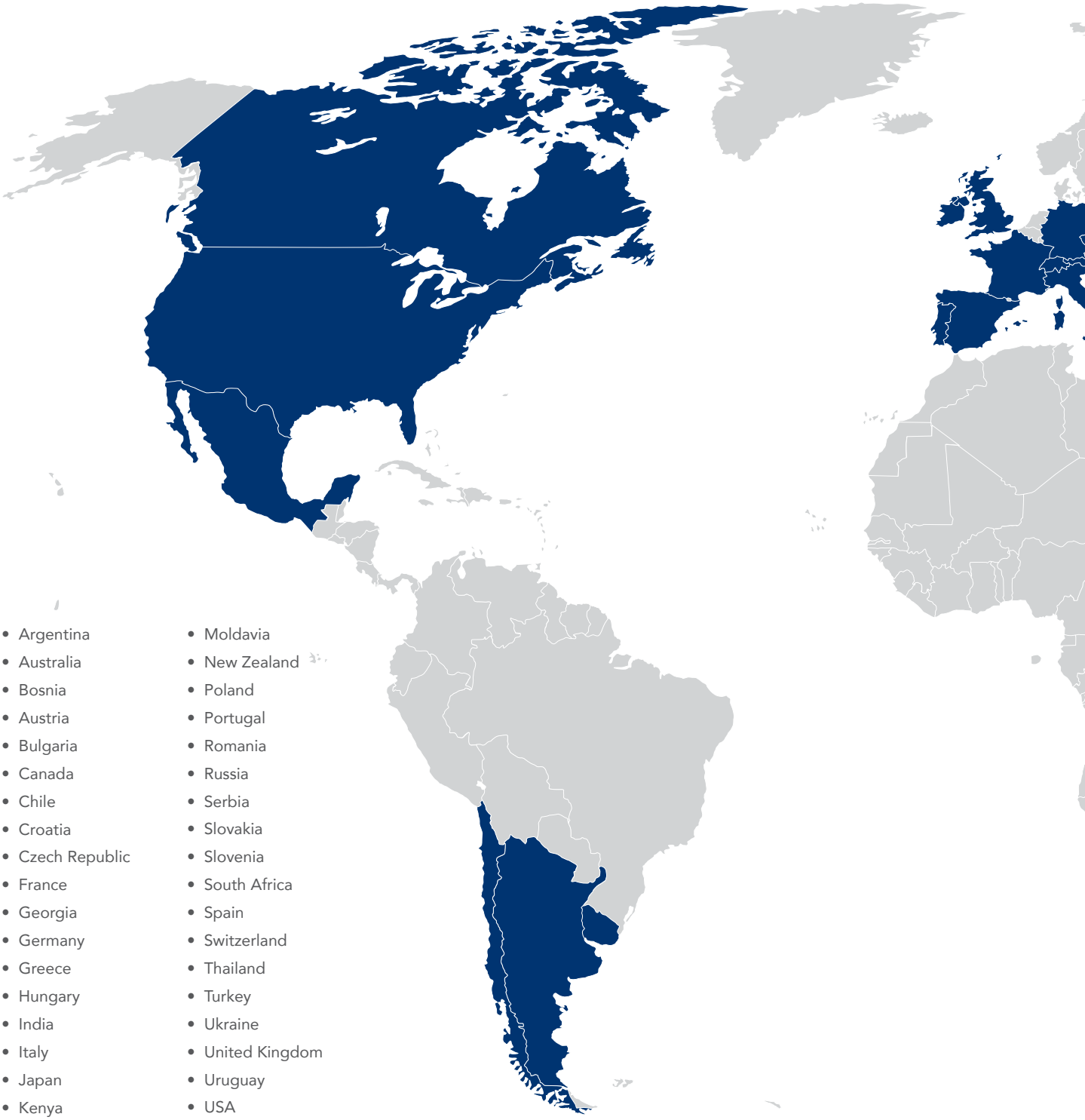
CHAPTER 1: YEAST

ANCHOR YEAST GLOBAL FOOTPRINT



- Argentina
- Australia
- Bosnia
- Austria
- Bulgaria
- Canada
- Chile
- Croatia
- Czech Republic
- France
- Georgia
- Germany
- Greece
- Hungary
- India
- Italy
- Japan
- Kenya
- Mexico
- Moldavia
- New Zealand
- Poland
- Portugal
- Romania
- Russia
- Serbia
- Slovakia
- Slovenia
- South Africa
- Spain
- Switzerland
- Thailand
- Turkey
- Ukraine
- United Kingdom
- Uruguay
- USA

INTRODUCTION

What is yeast?

yeast
noun
eukaryotic microorganism that can metabolise sugars anaerobically through a process of alcoholic fermentation

FACTORS INFLUENCING YEAST CELL METABOLISM:

Sugar

Hexoses are the fermentable sugars (glucose and fructose), whilst pentoses are utilised by non-*Saccharomyces*. High sugar concentrations result in osmotic stress and higher ethanol concentrations results in more toxicity. Sugar transporters also have a lower affinity for fructose, often causing an imbalance in the glucose:fructose ratio.

Nitrogen

Nitrogen is required for protein synthesis, including enzymes for the glycolytic pathway, essential for fermentation. Reduced nitrogen results in lower cellular activity and less biomass. Yeast assimilable nitrogen (YAN) refers to the nitrogen sources readily assimilated by the yeast: ammonia and amino acids.

Ethanol

Yeast strains display a difference in ethanol tolerance. High levels potentially lead to stuck/sluggish fermentations and inhibit yeast growth and cell viability. This is a direct result of the inhibition of amino acid permease and glucose transport systems, whereby ethanol influences the integrity of the yeast plasma membrane. Ethanol also increases the toxicity of other compounds like medium chain fatty acids.

Sulphur dioxide (SO_2)

Sulphur dioxide plays both an antiseptic and anti-oxidative role. The anti-microbial action of molecular SO_2 is influenced by pH, temperature and time of exposure. Sulphur dioxide is taken up by the yeast cell via diffusion where high concentrations could cause stuck/sluggish fermentation: it causes a rapid decrease in the intracellular ATP which causes cell death; it also reacts with NAD^+/NADP and thereby affects the enzymatic systems of the yeast cell.

Temperature

Extreme temperatures affect yeast growth and metabolism and have an impact especially during the budding phase of the yeast. Very low temperatures reduce the fluidity of the yeast plasma membrane, which can result in stuck or sluggish fermentations. Higher fermentation temperatures in red wine enhance the negative impact of ethanol. Even small temperature fluctuations during the budding phase (rehydration and lag phase) could have a negative impact causing the production of heat shock proteins.

pH and potassium (K^+)

The K^+ concentration of grape juice plays a key role in the pH tolerance of *Saccharomyces cerevisiae*. A higher K^+ concentration results in more glucose consumption and at a higher rate, whilst a lower K^+ concentration results in reduced fermentation capacity.

Vitamins and minerals

Vitamins serve as co-factors in enzymatic conversions and deficiencies can be created due to: high SO_2 concentration, pasteurization, ion exchange, mother tanking and mould infestations on grapes. Mould infestation may also result in decreased mineral availability, which in turn results in decreased yeast metabolism and biomass.

Oxygen (O_2), sterols and unsaturated fatty acids

Oxygen is required for the synthesis of cellular compounds and efficient growth, not for energy production. Yeast cells require 5-10 mg/L O_2 for cell growth. Reduced oxygen levels result in reduced biomass and reduced glycolysis due to the inhibition of fatty acid and sterol synthesis. Sterols and long chain unsaturated fatty acids act as survival factors, anaerobic growth factors and oxygen substitutes. These compounds are responsible for maintaining cell membrane integrity and permeability for cellular metabolism (enhanced ethanol tolerance and cell viability when ethanol increases). After crushing, there is usually sufficient dissolved oxygen in the must.

Medium chain fatty acids

The most influential of these are octanoic and decanoic acids. Factors influencing their production include strain dependency, O_2 addition, fermentation temperature and degree of must clarification. These compounds decrease the maximum growth rate and biomass production of *S. cerevisiae*. This extends the lag phase.

Acetic acid

In fermenting cells, pyruvate is reduced to ethanol and ethanol is oxidised to acetaldehyde, which can be further oxidised to acetic acid. The most important factor influencing the acetic acid concentration is the yeast strain. Secondary factors include the presence of non-*Saccharomyces* yeast, nitrogen content, fermentation temperature and excessive clarification of the must.

Clarification

This can result in delayed fermentations and the production of volatile acidity. Clarification deprives the yeast of unsaturated fatty acids and synthesising them from pyruvate is only possible under aerobic conditions. Under anaerobic fermentation conditions, acetate is formed.

Fungicides, pesticides and copper

There are maximum residue levels, limits and withholding periods in place. Whilst copper is an essential heavy metal to all organisms, there is a very narrow optimum concentration range. Copper results in rapid loss of cellular K^+ levels and permeabilization of the plasma membrane. Copper sensitivity is strain dependent.

Non-*Saccharomyces* species

Their concentration usually varies from 10^2 – 10^4 CFU/berry, depending on climate. Some species survive normal SO_2 dosages and are later killed by ethanol. These species use nutrients at the expense of inoculated starter cultures. These species also tend to produce acetic acid and possibly proteinaceous killer toxins.

Acetic acid bacteria

These bacteria are able to survive and grow in anaerobic conditions. They have a negative effect on yeast growth and fermentation efficiency (directly or indirectly). The production of acetic acid is toxic to yeast and can also lower the glucose to fructose ratio that can result in problematic fermentations.

Lactic acid bacteria and mould

The amount of lactic acid bacteria is dependent on climate, region, SO_2 dosage and wine pH. Fungi like *Aspergillus* and *Botrytis* can produce toxic substances.

YEAST SELECTION

WHITE WINE STRAINS

	Anchor Exotics Mosaic (NEW NAME same product)	Anchor Exotics Novello (NEW PRODUCT)	Anchor Alchemy I	Anchor Alchemy II	Anchor VIN 2000	Anchor VIN 13	Anchor VIN 7
Application	**iconic wines**	**iconic wines**	**ester production**	**thiol production**	**complex wines**	**fruity wines**	**thiol production**
Also suitable for rosé	■	■				■	■
Blend			■	■			
Hybrid	■	■			■	■	
Natural isolate							■
Restart stuck fermentation						■	
Fructophilic	■				■	■	
Cold tolerance	18°C	15°C	12°C	12°C	12°C	10°C	13°C
Alcohol tolerance	15.5%	15.5%	15.5%	15.5%	15.5%	17%	14.5%
Osmotolerance	25°B	25°B	25°B	25°B	25°B	27°B	24°B
Nitrogen demand	average	average	average	average	low	low	complex
Sensory descriptors	exotic fruits stone fruits floral mouthfeel	grapefruit guava passion fruit gooseberry fresh and fruity	fruity floral	granadilla guava	floral citrus tropical pineapple papaya	fruity floral terpenes muscat	grapefruit guava passion fruit gooseberry

	Anchor NT 116	Anchor WE 14	Anchor N96	Fermivin LVCB	Fermivin 4F9	Fermivin Champion
Application	**crisp wines**	**sweet wines**	**sparkling base wines**	**wines with minerality**	**wines with volume**	**restart fermentation**
Also suitable for rosé						
Blend						
Hybrid						
Natural isolate						
Restart stuck fermentation						
Fructophilic						
Cold tolerance	11°C	14°C	11°C	12°C	14°C	15°C
Alcohol tolerance	16%	15%	16.5%	15%	15.5%	18%
Osmotolerance	26°B	24°B	27°B	25°B	26°B	30°B
Nitrogen demand	low	high	low	low	average	average
Sensory descriptors	tropical fruit citrus thiols	natural sweet wines	neutral	minerality lemongrass pear citrus apricot peach	guava passion fruit volume body	varietal character

YEAST SELECTION

RED WINE STRAINS

	Anchor Exotics Mosaic (NEW NAME same product)	Anchor Exotics Novello (NEW PRODUCT)	Anchor Alchemy III	Anchor Alchemy IV	Anchor NT 202	Anchor NT 50	Anchor NT 116
Application	**iconic wines**	**iconic wines**	**complex wines**	**wines with intense fruit**	**structured wines**	**fruity wines**	**full-bodied wines**
Also suitable for rosé	■	■		■			
Blend			■	■			
Hybrid	■	■			■	■	■
Natural isolate							
Restart stuck fermentation							
Fructophilic	■				■		
Cold tolerance	18°C	15°C	16°C	16°C	18°C	13°C	11°C
Osmotolerance	25°B	25°B	26°B	26°B	26°B	26.5°B	26°B
Alcohol tolerance	15.5%	15.5%	15.5%	15.5%	16%	16.5%	16%
Nitrogen demand	average	average	average	average	average	high	low
MLF compatibility	+++	++	++	++	+++	++	++
Sensory descriptors	red fruit black fruit cocoa floral	soft tannins red and black fruit	complex esters structure body	intense fruit red fruit smooth	blackberry blackcurrant tobacco prune red berries	blackberry blackcurrant cherry spice	blackberry blackcurrant red berries

	Anchor NT 112	Anchor WE 372	Anchor WE 14	Fermivin VR5	Fermivin MT48	Fermivin A33	Fermivin XL	Fermivin Champion
Application	**wines with firm tannin structure**	**wines with floral characters**	**Pinotage**	**wines to be aged**	**fruity, spicy wines**	**structured wines**	**smooth wines**	**restart fermentation**
Also suitable for rosé								
Blend								
Hybrid								
Natural isolate								
Restart stuck fermentation								
Fructophilic								
Cold tolerance	20°C	16°C	14°C	18°C	20°C	22°C	20°C	15°C
Osmotolerance	26°B	24.5°B	25°B	26°B	25°B	26°B	26°B	30°B
Alcohol tolerance	16%	15%	15%	15.5%	15%	15.5%	15.5%	18%
Nitrogen demand	average	average	high	low	low	high	average	average
MLF compatibility	+	++	++	++	++	++	++	n/a
Sensory descriptors	structured blackberry blackcurrant	red berry floral	red fruit and cherry in Pinotage	blackcurrant prune cherry spice structure	soft tannins cherry raspberry blackberry plum	blackcurrant blackberry roasted aromas chocolate	red fruit black fruit low astringency roundness	varietal character

PRODUCT CATALOGUE

Anchor Oenology provides you with two distinct ranges of yeast: Anchor and Fermivin. Anchor is selected and developed for the South African industry and the new-world style of wine production. Fermivin provides the winemaker with a more traditional option, focusing on yeast strains that were mainly selected from Europe and for producing more varietal-style wines.

FOR THE PRODUCTION OF WHITE WINES

Rosé R Restart

EXOTICS MOSAIC

NEW NAME same product

Institute for Wine Biotechnology, Stellenbosch University
S. cerevisiae x S. paradoxus hybrid

ICONIC BARREL FERMENTED WHITE AND ROSÉ WINES WITH INTENSE MOUTHFEEL

DESCRIPTORS: guava, granadilla, grapefruit, tropical fruit salad and stone fruit aromas

APPLICATIONS: Chenin blanc, Chardonnay, Viognier and rosé wines with intense mouthfeel and finish

NOTES:
- Fermentations above 18°C.
- High glycerol production.
- Good mouthfeel.
- Fructophilic.
- Pectolytic activity.

DOSAGE: 30 g/hL

SKU: 250 G

EXOTICS NOVELLO

NEW PRODUCT

Australian Wine Research Institute
S. cerevisiae x S. cariocanus hybrid

ICONIC, FRESH AND FRUITY WINES WITH THIOL AROMAS

DESCRIPTORS: fruity and floral esters, with enhanced thiol aromas of granadilla and guava

APPLICATIONS: Sauvignon blanc, Chenin blanc, Colombard and thiol-style Rosé wines

NOTES:
- Cold tolerance of 15°C.
- Enhanced softness.
- Decreased tannin intensity, astringency and bitterness.

DOSAGE: 30 g/hL

SKU: 250 G

ALCHEMY I

Australian Wine Research Institute
Yeast blend

WINES WITH FRUITY AND FLORAL ESTERS

DESCRIPTORS: fruity and floral esters, tropical fruit and citrus aromas and some volatile thiols such as granadilla, grapefruit, gooseberry and mango aromas add to complexity

APPLICATIONS: tank fermentations of Sauvignon blanc, Chenin blanc, Chardonnay, Viognier, Riesling and Pinot gris

NOTES:
- Cold fermentation.
- High alcohol tolerance.

DOSAGE: 20 g/hL

SKU: 1 KG

ALCHEMY II

Australian Wine Research Institute
Yeast blend

WINES WITH VOLATILE THIOLS

DESCRIPTORS: granadilla, grapefruit, gooseberry and guava

APPLICATIONS: tank fermentations of Sauvignon blanc, Chenin blanc and Colombard

NOTES:
- Cold fermentation.
- High alcohol tolerance.
- New Zealand style Sauvignon blanc.

DOSAGE: 20 g/hL

SKU: 1 KG

VIN 2000

Institute for Wine Biotechnology, Stellenbosch University
S. cerevisiae x S. cerevisiae hybrid

FULL-BODIED WINES WITH GOOD MOUTHFEEL

DESCRIPTORS: fresh pineapple, papaya, grapefruit, tropical and citrus aromas, floral and fruity aromas

APPLICATIONS: Chardonnay, Chenin blanc and Viognier

NOTES:
- Slower, reliable fermentation rate.
- High alcohol tolerance.
- Fructophilic.
- Highly suitable for barrel fermentations.

DOSAGE: 20 g/hL

SKU: 1 KG

VIN 13

Stellenbosch University
S. cerevisiae subsp. cerevisiae x S. cerevisiae subsp. bayanus hybrid

AROMATIC WHITE AND ROSÉ WINES

DESCRIPTORS: fresh fruit salad, pineapple, floral and fruity (white wines); strawberry and raspberry (rosé wines)

APPLICATIONS: all white varieties and rosé

NOTES:
- Robust and aromatic.
- Fast fermentation rate.
- Extremely sugar, alcohol and cold tolerant.
- Restart stuck fermentations.

DOSAGE: 20 g/hL

SKU: 1 KG

SKU AVAILABLE ON PRE-ORDER: 5 KG / 10 KG

VIN 7

Natural triploid hybrid isolated from nature
S. cerevisiae (diploid) x S. kudriavzevii (haploid) hybrid

THIOLIC WHITE AND ROSÉ WINES

DESCRIPTORS: guava and granadilla, grapefruit and gooseberry

APPLICATIONS: Sauvignon blanc, Chenin blanc, Colombard and thiol-style rosé wines

NOTES:
- Can foam and produce volatile acidity under stress conditions.
- Ensure sufficient complex nutrition and temperature control.

DOSAGE: 20 g/hL

SKU: 1 KG

SKU AVAILABLE ON PRE-ORDER: 5 KG / 10 KG

NT 116

Agricultural Research Council, Nietvoorbij
S. cerevisiae x S. cerevisiae hybrid

CRISP, AROMATIC WHITE WINES

DESCRIPTORS: tropical fruit salad, zesty citrus and volatile thiols like guava and gooseberry aromas, enhances neutral varieties

APPLICATIONS: Chenin blanc, Chardonnay, Colombard and Pinot gris

NOTES:
- High sugar, alcohol and cold tolerance.
- Intense ester production.

DOSAGE: 20 g/hL

SKU: 1 KG

SKU AVAILABLE ON PRE-ORDER: 5 KG / 10 KG

WE 14

Agricultural Research Council, Nietvoorbij
S. cerevisiae

NATURAL SWEET WHITE WINES

DESCRIPTORS: neutral sensory contribution in white wines

APPLICATIONS: all white varieties

NOTES:
- Resistant to *Botrytis cinerea* toxins.
- Cold sensitivity allows for the arrest of fermentation at the desired sugar concentration.

DOSAGE: 30 g/hL

SKU: 1 KG

N 96

Agricultural Research Council, Nietvoorbij
S. cerevisiae subsp. bayanus

STRONG FERMENTING, ALL-PURPOSE WINE YEAST

DESCRIPTORS: neutral sensory contribution allows varietal character to dominate

APPLICATIONS: all white varieties and MCC wines

NOTES:
- Suitable for cider production.
- Primary and secondary fermentations of MCC wines, as well as cider production.

DOSAGE: 20 g/hL

SKU: 1 KG

SKU AVAILABLE ON PRE-ORDER: 5 KG

LVCB

Fermivin

Selected by University of Chile
S. cerevisiae subsp. bayanus

MINERAL, FRESH, AROMATIC WHITE WINES

DESCRIPTORS: fruity, fresh aromas, high minerality, hints of lemongrass, pear, citrus and stone fruit

APPLICATIONS: all white varieties

NOTES:
- Fermenting highly clarified must.
- Suitable for secondary fermentation with Charmat method.

DOSAGE: 20 g/hL

SKU: 500 G

FOR THE PRODUCTION OF RED WINES

4F9

Fermivin

Selected by the French Vine and Wine Institute (IFV), Loire Valley - France
S. cerevisiae subsp. bayanus

AROMATIC WHITE AND ROSÉ WINES WITH A LONG FINISH

DESCRIPTORS: intense, exotic fruit, guava, passion fruit, well-balanced and round on the palate

APPLICATIONS: all white varieties and wines to be aged on fine lees, as well as full-bodied rosé wines

NOTES:
- For improvement of wine body and volume.
- Suitable for secondary fermentation with Charmat method.

DOSAGE: 20 g/hL

SKU: 500 G

CHAMPION

Fermivin

Selected by the French National Institute for Agricultural Research (INRA), Languedoc - France
S. cerevisiae subsp. bayanus

RESTARTING STUCK FERMENTATIONS

DESCRIPTORS: neutral

APPLICATIONS: all white varieties

NOTES:
- Respects varietal character.

DOSAGE: 20 - 30 g/hL

SKU: 500 G

EXOTICS MOSAIC

NEW NAME same product

Institute for Wine Biotechnology, Stellenbosch University
S. cerevisiae x S. paradoxus hybrid

ICONIC RED WINES

DESCRIPTORS: red and black fruits, violets, cocoa aromas and flavours

APPLICATIONS: Shiraz, Merlot and Pinotage

NOTES:
- Fermentations above 18°C.
- High glycerol production.
- Good mouthfeel.
- Fructophilic.
- Partially degrades malic acid.

DOSAGE: 30 g/hL

SKU: 250 G

EXOTICS NOVELLO

NEW PRODUCT

Australian Wine Research Institute
S. cerevisiae x S. cariocanus hybrid

SOFT, FULL-BODIED AND AROMATIC RED WINES

DESCRIPTORS: fresh, fruity and floral red wines with a softened, but structured palate

APPLICATIONS: All red varietals

NOTES:
- Decreased astringency, dryness and bitterness.
- Increased mouthfeel and quality.
- Increased red, black fruit and spicy notes.
- Decreased green and vegetal characters.

DOSAGE: 30 g/hL

SKU: 250 G

ALCHEMY III

Australian Wine Research Institute
Yeast blend

COMPLEX RED WINES

DESCRIPTORS: complex, rose, floral, fruit and raspberry characters with good structure and body

APPLICATIONS: all red varietals

NOTES:
- Stable fruit esters.
- Masks green characters.

DOSAGE: 30 g/hL

SKU: 1 KG

Rosé Restart

ALCHEMY IV

Australian Wine Research Institute
Yeast blend

INTENSE FRUIT RED WINES

DESCRIPTORS: red fruit aroma intensity like cherry, raspberry, redcurrant and pomegranate, rounded and smooth wines

APPLICATIONS: all red varieties

NOTES:
- Stable esters.
- Wines to be aged.
- Terpenes produced.
- Masks green characters.

DOSAGE: 30 g/hL

SKU: 1 KG

NT 202

Agricultural Research Council, Nietvoorbij
S. cerevisiae x S. cerevisiae hybrid

INTENSE, STRUCTURED AND COMPLEX RED WINES

DESCRIPTORS: red and black fruits, blackberry and blackcurrant, tobacco and prune, fresh plum aromas

APPLICATIONS: Pinotage, Merlot and Cabernet Sauvignon

NOTES:
- Fuctophilic.
- Stimulates MLF.
- Not suitable for cold soaking.

DOSAGE: 30 g/hL

SKU: 1 KG

SKU AVAILABLE ON PRE-ORDER: 10 KG

NT 50

Agricultural Research Council, Nietvoorbij
Incomplete S. cerevisiae x S. kudriavzevii hybrid

FRUITY, ROUNDED AND EASY DRINKING RED WINES

DESCRIPTORS: strawberry, cherry, blackberry, blackcurrant and some spicy and chocolate aromas

APPLICATIONS: Cabernet Sauvignon, Pinotage, Pinot noir, Merlot, Shiraz and Tempranillo

NOTES:
- Suitable with or without barrel ageing.
- Suitable for cold soaking.
- Masks green characters.
- High glycerol concentration softens the mouthfeel.

DOSAGE: 30 g/hL

SKU: 1 KG

SKU AVAILABLE ON PRE-ORDER: 5 KG

NT 116

Agricultural Research Council, Nietvoorbij
S. cerevisiae x S. cerevisiae hybrid

FULL-BODIED RED WINES FOR BARREL MATURATION

DESCRIPTORS: blackberry and blackcurrant, Bordeaux-style wines

APPLICATIONS: Cabernet Sauvignon and Shiraz

NOTES:
- Intense fruit on the palate.
- Suitable for cold soaking.
- Enhances varietal character.

DOSAGE: 30 g/hL

SKU: 1 KG

SKU AVAILABLE ON PRE-ORDER: 5 KG / 10 KG

NT 112

Agricultural Research Council, Nietvoorbij
S. cerevisiae x S. cerevisiae hybrid

RED WINES WITH FIRM TANNIN STRUCTURE

DESCRIPTORS: blackberry and blackcurrant aromas

APPLICATIONS: Cabernet Sauvignon and Shiraz

NOTES:
- Traditional style red wines to be aged.
- Fructophilic.
- Can produce SO_2 under stress conditions.
- Suitable for micro-oxygenation and thermovinification.

DOSAGE: 30 g/hL

SKU: 1 KG

WE 372

Isolated from nature
S. cerevisiae

FRUITY AND FLORAL RED WINES

DESCRIPTORS: strawberry, cherry, raspberry and blackberry, fruity and floral aromas

APPLICATIONS: all red varieties

NOTES:
- Cold sensitive.
- Softer, feminine-style wines.

DOSAGE: 30 g/hL

SKU: 1 KG

SKU AVAILABLE ON PRE-ORDER: 5 KG

WE 14

Agricultural Research Council, Nietvoorbij
S. cerevisiae

FRUITY PINOTAGE WINES

DESCRIPTORS: red fruit and cherry aromas

APPLICATIONS: Pinotage

NOTES:
- Must be co-inoculated with a robust red wine yeast strain.

DOSAGE: 15-20 g/hL (in co-inoculation)

SKU: 1 KG

VR5

Fermivin

Selected in Burgundy - France
S. cerevisiae

RED WINES TO BE AGED

DESCRIPTORS: blackcurrant, prune, cherry aromas and spicy hints, rich and plenty of structure, stable colour

APPLICATIONS: all red varieties

NOTES:
- Promotes optimum extraction of polyphenols and stabilization over time.

DOSAGE: 20 g/hL

SKU: 500 G

MT48

Fermivin

Selected by the French Vine and Wine Institute (IFV), Bordeaux – France and Bordeaux Wine Council
S. cerevisiae

FRUITY AND SPICY RED WINES

DESCRIPTORS: expressive wines with soft tannins, cherry, raspberry, blackberry, plum and spices

APPLICATIONS: all red varieties

NOTES:
- Suitable for wines matured for short periods.
- High concentration of glycerol produced.

DOSAGE: 20 g/hL

SKU: 500 G

A33

Fermivin

Selected by the University of Chile
S. cerevisiae

STRUCTURED RED WINES

DESCRIPTORS: blackcurrant and blackberry aromas with roasted and chocolate hints

APPLICATIONS: all red varieties

NOTES:
- Promotes polyphenol extraction and stabilises anthocyanins.

DOSAGE: 20 g/hL

SKU: 500 G

XL

Fermivin

Selected by the University of Santiago - Chile
S. cerevisiae

FRUITY AND SMOOTH RED AND ROSÉ WINES

DESCRIPTORS: red and black fruits, low astringency and roundness on the palate

APPLICATIONS: all red varieties

NOTES:
- Adsorbs astringent tannins and reduces wine astringency.

DOSAGE: 20 g/hL

SKU: 500 G

CHAMPION

Fermivin

Selected by the French National Institute for Agricultural Research (INRA), Languedoc - France
S. cerevisiae subsp. bayanus

RESTARTING STUCK FERMENTATIONS

DESCRIPTORS: neutral

APPLICATIONS: all red varieties

NOTES:
- Respects varietal character.

DOSAGE: 30-60 g/hL

SKU: 500 G

WHAT'S NEW

THE EXOTICS RANGE

THE FUTURE LOOKS EXOTIC

EXOTICS
[(ig-zŏt'ik): intriguingly unusual, original & exciting]

The concept behind these unique hybrids is to provide you with all the benefits and complexity of a spontaneous fermentation, without the associated risks. Now Exotics will be known as a range of yeast strains, no longer just a single product. And we are introducing a brand new interspecies hybrid to complement the complex flavour profile you have come to expect from the Exotics range.

MOSAIC
S. cerevisiae x S. paradoxus hybrid
ICONIC, COMPLEX AND INTENSE WINES

EXOTICS MOSAIC

S. cerevisiae x S. paradoxus hybrid (previously Exotics SPH)
For iconic, complex and intense red and white wines
Temp. ≥ 18°C, Sugar tolerance: 25°Brix, Glycerol: 9-10 g/L

NEW NAME same product

NOVELLO
S. cerevisiae x S. cariocanus hybrid
ICONIC, FRESH AND FRUITY WINES

EXOTICS NOVELLO

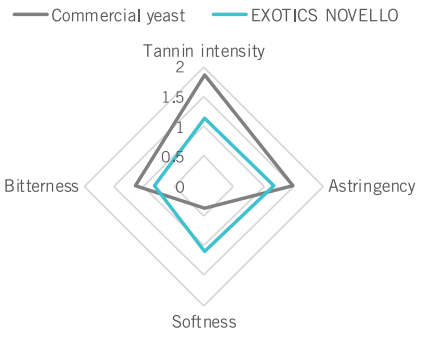
S. cerevisiae x S. cariocanus hybrid
For soft, fresh, full-bodied and aromatic red and white wines
Temp. ≥ 15°C, Sugar tolerance: 25°Brix, Glycerol: 8-9 g/L

NEW PRODUCT

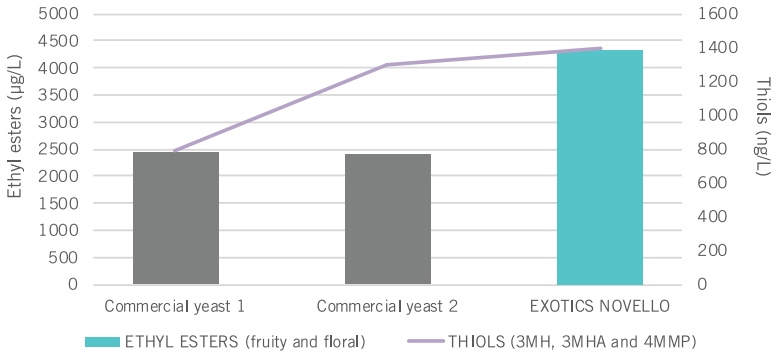
EXOTICS NOVELLO

White wine		Red wine	
Increase	**Decrease**	**Increase**	**Decrease**
softness fruity and floral esters thiols	tannin intensity, astringency and bitterness	mouthfeel red and black fruit and spicy notes overall quality	astringency, dryness and bitterness green and vegetal characters

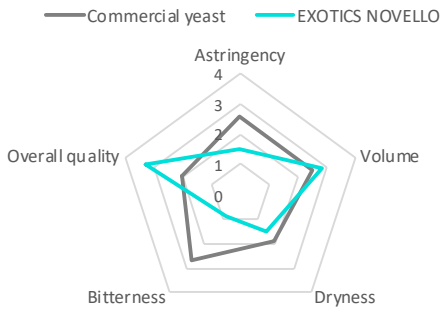
Taste impact of EXOTICS NOVELLO in Sauvignon blanc



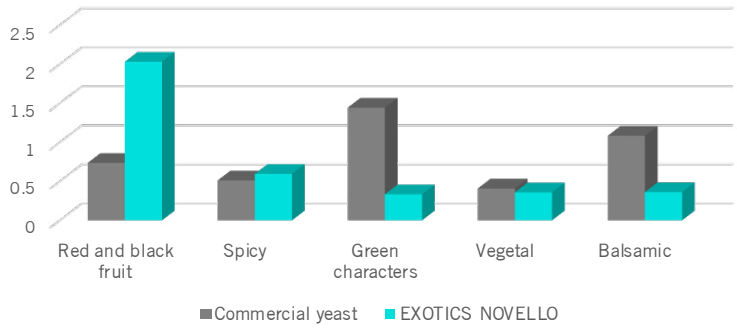
Aroma impact of EXOTICS NOVELLO in Sauvignon blanc



Taste impact of EXOTICS NOVELLO in Merlot



Aroma impact of EXOTICS NOVELLO in Merlot



The Exotics range, now consisting of MOSAIC and NOVELLO, provides you with unique hybrid yeast strains that produce complex and iconic wines with all the benefits of a spontaneous fermentation and none of the risks.

CHAPTER 2: NUTRIENTS

INTRODUCTION

What is a nutrient?

nutrient
noun
a substance that provides nourishment essential for the maintenance of life and for growth

The majority of the energy required by an organism to function on a metabolic level, is found in macronutrients. The necessary cofactors for metabolism are provided by micronutrients. Both are essential for fermentation and biomass production. Nutrients essential for fermentation include the following:

- Carbon source (glucose and fructose)
- Nitrogen source (ammonia and amino acids)
- Phosphate
- Vitamins and minerals
- Long chain fatty acids and sterols (survival factors)

NITROGEN

Nitrogen is required to produce proteins required for fermentation and biomass production. These include enzymes in the glycolytic pathway responsible for fermentation and permeases responsible for transporting components into the cells. The absolute minimum nitrogen requirement is approximately 150 mg/L, whilst the preferred concentration usually varies from 225 -275 mg/L. The requirement is influenced by the fermentation parameters, yeast strain nutritional needs and the initial nitrogen composition of the must. Some factors that can influence the nitrogen composition of the must include: vineyard fertilisation, berry maturation, vine water status, soil type and composition, cultivar and rootstock, climate, irrigation and other vineyard management practices.

Yeast assimilable nitrogen (YAN) refers to the fraction of nitrogen available for uptake by the yeast.

YAN = ammonium ions and amino acids.

A shortage of YAN could lead to the production of off flavours like hydrogen sulphide, mercaptans and sulphur-containing compounds (rotten egg smell), sluggish or stuck fermentations.

Ammonia

- Ammonia is the most preferred source of nitrogen.
- Early ammonium additions suppress amino acid uptake.
- Addition after the start of fermentation is recommended.
- Addition results in an increased fermentation rate immediately after addition.
- Excessive nitrogen at the start results in larger biomass production and an increased nitrogen demand later in the fermentation.

The most common source of ammonia is di-ammonium phosphate (DAP).

1 g/L DAP provides about 258 mg/L fermentable nitrogen.

Phosphate, also delivered by DAP, impacts on cell growth, biomass yield and fermentation rate.

Amino acids

Yeasts are unable to uptake and degrade proteins from the must and therefore use amino acids for protein synthesis during growth.

- Amino acids make up about 25-30% of berry nitrogen.
- Can range from 60-400 mg/L in must.

Amino acids are taken up via active transport across the membrane into the cytoplasm. Ethanol negatively influences the plasma membrane integrity, which means amino acids cannot be taken up later during the fermentation. It is therefore best to avoid the addition of inorganic nitrogen at the beginning of fermentation as this will then be the preferred nitrogen source. In addition, bentonite treatments early in the fermentation can bind amino acids and remove them from the must.

The most important amino acids (quantity) in must include proline, arginine and glutamine. Other amino acids of importance include glutamate, alanine, serine and threonine.

- Glutamine and glutamate: preferred for yeast growth.
- Aspargine, aspartate, serine, alanine: most support of rapid growth.
- Proline: not metabolised under anaerobic conditions.

VITAMINS

Vitamins can be synthesised or be taken up from the must. These compounds are used as co-factors in enzymatic conversions and are usually found in sufficient concentrations in the must. The most important vitamins are thiamine, biotin and pantothenate. Biotin and thiamine increase the viable yeast count and fermentation rate. Mould infestation and propagation reduce the vitamin content. Thiamine can be synthesised by yeast, but this results in slow fermentation, less biomass production and sluggish/stuck fermentation.

MINERALS

Minerals are used as co-factors in enzymatic requirements. Magnesium plays a key role in metabolic control, growth, proliferation and stabilising nucleic acids, proteins, polysaccharides and lipids.

SURVIVAL FACTORS

Survival factors are only formed in the presence of oxygen and are therefore known as oxygen substitutes. These include sterols and long chain unsaturated fatty acids. These compounds are responsible for ensuring the correct cell membrane integrity and permeability for cellular metabolism. Grape must usually contains sufficient oxygen after crushing for adequate synthesis of these factors. Active dried yeast produced under aerobic conditions are high in these factors, so are inactivated yeast cells/cell walls. On the other hand, propagation, excessive clarification and ascorbic depletes these survival factors.

NUTRIENT SELECTION

	ANCHORFERM	NUTRIVIN	NUTRIVIN SUPER	NATUFERM BRIGHT (NEW PRODUCT)	NATUFERM PURE (NEW PRODUCT)	EXTRAFERM
Rehydration	■					
Complex		■	■			
Aroma enhancing	■			■		
Source of organic nitrogen				■	■	
Detoxifying						■
Nitrogen contribution at 20 g/hL dosage	2 mg/L	30 mg/L	26 mg/L	2.5 mg/L	5 mg/L	0 mg/L
Use in conjunction with additional nitrogen source	■			■		■
CONTAINS:						
Inactivated yeast	■	■	■			
Di-ammonium phosphate		■	■			
Ammonium sulphate		■				
Thiamine	■		■			
Autolysed yeast				■	■	
Yeast hulls						■

NUTRIENT REQUIREMENTS OF OUR YEAST PORTFOLIO

	SUGAR CONCENTRATION OF THE MUST			
YEAST NITROGEN REQUIREMENT (mg/L)	22-24°B	24-26°B	>26°B	**YEAST STRAINS**
LOW	175	190	200	VIN 2000; VIN 13; NT 116; N 96; LVCB; VR5; MT48
MEDIUM	200	225	250	Exotics; Alchemy; NT 202; NT 112; WE 372; XL; 4F9; Champion
HIGH	290	315	340	VIN 7; WE 14; NT 50; A33

PRODUCT CATALOGUE

ANCHORFERM

A rehydration nutrient consisting of inactivated yeast to increase yeast viability and fermentation capabilities.

REHYDRATION

APPLICATION:
- Thiamine stimulates yeast growth and metabolism.
- Inactivated yeast are rich in vitamins and minerals and other trace elements required for optimum yeast performance, as well as reducing the risk of stuck fermentation and off-odours.
- Sterols and long chain fatty acids improve alcohol tolerance.

USAGE: Add to rehydration mixture together with yeast.

DOSAGE: 20 g/hL

SKU: 1 KG / 10 KG

NUTRIVIN

Complex nutritional supplement to adjust the yeast assimilable nitrogen.

STANDARD FERMENTATION CONDITIONS

APPLICATION:
- Complex nutrition will stimulate yeast growth and metabolism.

USAGE: Use after the start of fermentation to allow for the uptake of amino acids before addition. Another addition later in the fermentation could be beneficial. Avoid addition at the end of fermentation.

DOSAGE: 20 g/hL

SKU: 1 KG / 10 KG

NUTRIVIN SUPER

Thiamine-enriched complex nutrition formulated for increased stress conditions like high sugar must, low nutrient status and infected grapes.

CHALLENGING FERMENTATION CONDITIONS

APPLICATION:
- Complex nutrition will stimulate yeast growth and metabolism.

USAGE: Use after the start of fermentation to allow for the uptake of amino acids before addition. Another addition later in the fermentation could be beneficial. Avoid addition at the end of fermentation.

DOSAGE: 20 g/hL

SKU: 1 KG / 10 KG

NATUFERM BRIGHT

NEW PRODUCT

Natuferm Bright is a yeast autolysate. It is very high in amino acids (aroma precursors), which play an important role in assisting the yeast in the release of thiols during alcoholic fermentation. Its high ergosterol content – essential for yeast cell functioning – also make it a suitable nutrient for extreme fermentation conditions.

ENHANCED AROMA PRODUCTION IN WHITE AND ROSÉ WINES

APPLICATION:
- Promotes the release of aromatic thiol and ester compounds.
- Maintains the ability of the yeast to ferment sugars.
- Corrects small assimilable nitrogen deficiencies.

USAGE: 100% *Saccharomyces cerevisiae* yeast autolysate in micro-granulated form for quick, easy suspension. Suspend Natuferm Bright in 10 times its weight in must. For best results, incorporate in two stages: add the first dose at inoculation and the second dose after the first third of alcoholic fermentation. In the event of severe nitrogen deficiency, we recommend supplementing with 20 g/hL Nutrivin Super from fermentation.

DOSAGE: 30-40 g/hL

SKU: 1 KG

NATUFERM PURE

NEW PRODUCT

Natuferm Pure is a source of autolysed yeast that is especially suitable in the case of nitrogen deficiency and/or high potential alcohol percentage. Its high nutrient content promotes yeast growth and the rapid completion of fermentation, whilst also preserving the aromatic typicity of each grape variety. Natuferm Pure increases the yeast's production of aromatic esters.

A YEAST-DERIVED NUTRIENT SOURCE OF ORGANIC NITROGEN

APPLICATION:
- Ensure regular, complete alcoholic fermentation.
- Ensures the yeast can withstand nitrogen deficiencies and/or must with high potential alcohol.
- Preserves and enhances the aromatic typicity of grape varieties.
- Contributes to the biosynthesis of esters.
- High in amino acids.
- High in trace elements.

USAGE: 100% *Saccharomyces cerevisiae* yeast autolysate in micro-granulated form for quick, easy suspension. Suspend Natuferm Pure in 10 times its weight in must. Incorporate during the first third of the alcoholic fermentation by pumping over after addition. Do not add ammonium salts at the same time. Inorganic nitrogen should be added after the first third of alcoholic fermentation.

DOSAGE: 20-40 g/hL (depending on the must's initial YAN content and/or potential alcohol strength)

SKU: 1 KG

EXTRAFERM

Consists of pure yeast hulls able to support fermentation and improve wine quality by adsorbing toxic compounds and off-flavours from must and wine.

DETOXIFYING MUST AND IMPROVING YEAST VIABILITY

APPLICATION:

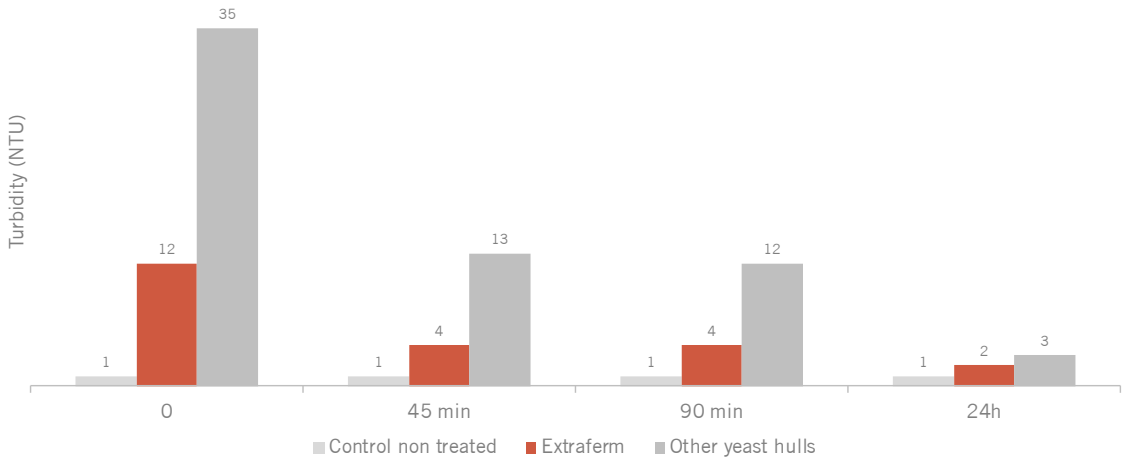
- Removal of yeast inhibitory compounds like medium chain fatty acids.
- Removal of toxic compounds like ochratoxin A.
- Removal of anisoles (TCA, TBA and PCA) and dibuthyl phtalates.
- Improve yeast viability and alcohol tolerance.

USAGE: Use at the beginning of fermentation in challenging must conditions (overly clarified). Use at the end of fermentation to increase yeast viability or to treat sluggish or stuck AF or MLF. Use as a detoxifying agent and proceed to rack the wine after treatment.

DOSAGE:

- 20 g/hL (prior to fermentation)
- 30 - 40 g/hL (sluggish or stuck fermentation)
- 20 - 40 g/hL (detoxification)

SKU: 1 KG

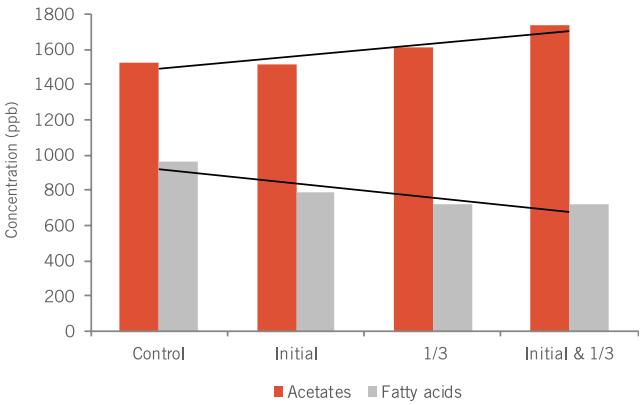


Extraferm is known for its fast settling once the wine has been treated. This allows for the fast and efficient racking of the treated wine. Only 45 minutes after the addition of 40 g/hL of Extraferm, the turbidity of the treated white wine decreased by 33%. The turbidity after 24 hours of settling is similar to that of the control wine. Therefore, treated wine can be racked and undergo further processing in a shorter amount of time.

THE NATUFERM RANGE

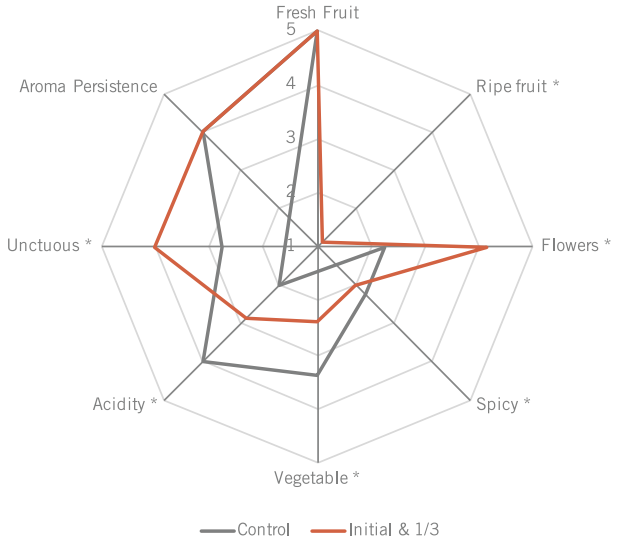
NATUFERM BRIGHT: SPECIFIC AUTOLYZED YEAST DESIGNED TO BOOST ESTERS AND THIOLS IN WHITE AND ROSÉ WINES

Natuferm® Bright is a new autolysed yeast rich in free amino acids which are precursors of esters and stimulate varietal thiol liberation. This autolysate is also rich in ergosterol that increases yeast viability, especially at the end of the alcoholic fermentation under stressful conditions. Recommended dose: 30 to 40 g/hL to be added in one or two additions at inoculation, then at 1/3 of AF (density > 1060).



Its richness in amino acid boosts the production of esters and thiols during alcoholic fermentation in white and rosé wines. The addition of Natuferm Bright in two additions, at the beginning and then at 1/3 of the fermentation (density > 1060), allows for a significant increase in the fruitiness of the wine. In parallel, the level of fatty acids, shown to mask aromas, is decreased. We obtain an even more intense and aromatic wine with the double addition.

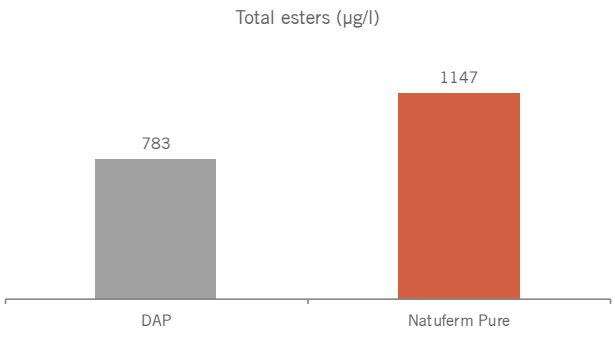
Test on a Chardonnay grape variety (12% vol., YAN 150 mg/L, AF at 15°C) – Comparison between an untreated control and a wine supplemented with 40 g/hL of Natuferm Bright (added at the start + after 1/3 of AF) – 8 tasters – * indicates a significant difference – Vitec, Spain 2017.



Adding Natuferm Bright in two stages – at the start and after 1/3 of alcoholic fermentation – makes wine significantly fruitier and also reduces its level of short-chain linear fatty acids (C_6-C_{10}), which are aroma-masking compounds. The wine obtained using the 'double addition' method is more aromatic and intense.

NATUFERM PURE

Natuferm Pure is a source of autolysed yeast that is especially suitable in cases of nitrogen deficiency and/or high potential alcohol percentage. Its high nutrient content promotes yeast growth and the rapid completion of fermentation, while also preserving the aromatic typicity of each grape variety. Natuferm Pure increases the yeast's production of aromatic fermentation esters. Because Natuferm Pure is an organic source of nitrogen, the best results are generated when used before the first third of the alcoholic fermentation, as well as before the use of an inorganic nitrogen source.



CHAPTER 3: BACTERIA

INTRODUCTION

What is bacteria?

bacterium

noun

a member of a large group of unicellular microorganisms which have cell walls but lack organelles and an organized nucleus

MALOLACTIC FERMENTATION

Lactic acid bacteria (LAB) in wine are responsible for the process of malolactic fermentation (MLF). This process has three main effects:

- Increased pH due to the de-acidification of malic to lactic acid.
- Increased microbial stability due to the removal of malic acid as a carbon substrate.
- Sensory modification of the wine via bacterial metabolism.

Lactic acid bacteria species from the general *Leuconostoc*, *Pediococcus*, *Lactobacillus* and *Oenococcus oeni*, are responsible for the changes to the wine matrix during MLF. Most commercial starter cultures comprise of *O. oeni*, but research in recent years has brought to light the beneficial impact of *Lactobacillus plantarum*, especially on the sensory characteristics of the wine. *Lactobacillus* are ideal as starter cultures as they are homofermentative and thus produce no volatile acidity, as well as having complex enzymatic profiles that allow for increased aroma production and/or release.

FACTORS INFLUENCING MLF

Yeast bacteria interactions

These interactions are influenced by the following three factors: strain specific characteristics of the yeast and bacteria; uptake and release of nutrients (sterols, amino acids, vitamins and mannoproteins) by the yeast; and the production of yeast-derived stimulatory/inhibitory compounds e.g. ethanol, sulphur dioxide, medium chain fatty acids, etc. The most important consideration for a winemaker is selecting the right combination of yeast and bacteria.

Ethanol, sulphur dioxide & medium chain fatty acids

Ethanol has an instant effect on the membrane integrity and viability of the bacteria cell and can result in cell death. The molecular fraction of SO_2 is the only fraction that can cross the bacterial cell wall via diffusion and therefore plays an anti-microbial role by inhibiting growth and disrupting proteins and co-factors. Medium chain fatty acids inhibit cell growth and malic acid metabolism. The mechanism includes the inhibition of ATPase activity which means the bacteria cannot maintain its intracellular pH. This results in a lack of a proton gradient and thus no transport of metabolites across the membrane is possible.

pH

The pH does not only influence the anti-microbial fraction of SO_2 present in the wine, but can also have a direct influence on the LAB species present in the must and/or wine by impacting on the growth rate, viability and metabolism of the bacteria. The optimum wine pH for bacteria is 3.5, but most commercial cultures can ferment at a wider pH range.

Temperature

The fermentation temperature directly impacts the growth rate, length of lag phase and population size of the LAB. The optimum temperature for bacteria is from 18-22°C, but the bacteria can survive and perform across a wider range (15-30°C).

Phenolic compounds

Both the flavonoid and non-flavonoid fractions of phenolic compounds can stimulate or inhibit LAB. This occurs via an interaction of the phenolic compounds with cellular enzymes and/or the adsorption of phenols to the cell walls. These compounds can also be metabolised by LAB to form other compounds, either positive or negative.

Lysozyme

Lysozyme can be used to inhibit LAB and delay/prevent the onset of MLF. See Chapter 6 for more details.

MLF & aroma

Lactic acid bacteria are able to impact the sensory profile of the wine by way of three mechanisms:

1. Via the metabolism of grape constituents e.g. sugar, amino acids etc.
2. The modification of grape/yeast-derived secondary metabolites.
3. Adsorption to the cell wall or the metabolism of flavour compounds.

The impact on the aroma however, can be influenced by many factors, including but not limited to: bacteria strain, cultivar, winemaking practices, the wine matrix, bacteria-yeast interactions, timing of inoculation and the fermentation vessel (tank vs. barrel). Bacteria are responsible for producing both wanted and unwanted aroma compounds. One of the most important aroma compounds produced during MLF, is diacetyl. The compound is responsible for the buttery character that arises during MLF.

Diacetyl

INFLUENCING FACTOR:	IMPACT ON DIACETYL:
bacteria strain	select strain with high or low production
wine type	higher production in red wine
inoculation rate	lower inoculation rate favours production
lees contact	reduces diacetyl content
oxygen	favours production of diacetyl
SO_2	binds diacetyl and reduces sensory impact
citric acid concentration	favours diacetyl production
temperature	lower temperature favours production
pH	lower pH favours production
sugar concentration	residual sugar reduces diacetyl production
stabilisation	stabilisation after MLF increases diacetyl

Esters

The most important esters produced during malolactic fermentation are ethyl lactate (fruity, buttery, creamy aromas and mouthfeel), as well as diethyl succinate, contributing fruity and melon aromas. The esterase activity of LAB are strain dependent.

Grape-derived compounds

Terpenes and norisoprenoids are released from their glycoside-bound precursors by LAB that display glycosidase activity under winemaking conditions. Selecting the appropriate bacteria culture can release this potential aroma pool, adding fruity and floral aromas to the wine.

BACTERIA SELECTION

	NEW NAME same product Anchor Duet Arom	NEW NAME same product Anchor Duet Soft
Application	**fruity and spicy notes**	**mouthfeel and softness**
Co-inoculation/Sequential	co-inoculation	co-inoculation
Freeze-dried		
Red wine		
White wine		
Oenococcus oeni		
Lactobacillus plantarum		
Optimum temperature	18-28°C	15-28°C
Alcohol tolerance	16%	15%
pH tolerance	≥3.5	≥3.2
SO_2 tolerance	50 ppm	50 ppm

PRODUCT CATALOGUE

ANCHOR DUET AROM

NEW NAME same product

Department of Viticulture and Oenology, Stellenbosch University
Bacteria blend of Oenococcus oeni x Lactobacillus plantarum

ENHANCED FRUITY AND SPICE NOTES

APPLICATION:
- Enhanced aroma intensity.
- Red fruit characters via ester production.
- Enhanced spicy notes.
- Increases terpenes and norisoprenoids that enhance fruity and floral characteristics.

USAGE: Co-inoculation - inoculate on the same day as the yeast. Rehydration in chlorine-free water for no more than 15 minutes.

DOSAGE: 1 g/hL

SKU: 25 G (25 HL)

ANCHOR DUET SOFT

NEW NAME same product

Institute for Wine Biotechnology, Stellenbosch University
Bacteria blend of Oenococcus oeni x Lactobacillus plantarum

ENHANCED MOUTHFEEL AND SOFTNESS

APPLICATION:
- Enhanced mouthfeel.
- Decreased green characters.
- Reduced astringency.
- Enhanced dark fruit aromas.

USAGE: Co-inoculation - inoculate on the same day as the yeast. Rehydration in chlorine-free water for no more than 15 minutes.

DOSAGE: 1 g/hL

SKU: 25 G (25 HL)

THE ANCHOR BACTERIA RANGE

NEW LOOK, SAME QUALITY ENHANCING BACTERIA

Since the launch of the Anchor Bacteria range in 2010, we have brought you two innovations, the first of their kind in the world: Blends of bacteria, *Oenoccocus oeni* and *Lactobacillus plantarum*, for enhancing wine quality during the co-inoculation of malolactic fermentation.

DUET AROM
Oenococcus oeni/Lactobacillus plantarum
For an enhanced AROMA PROFILE during malolactic fermentation

ANCHOR DUET AROM

Introducing Duet AROM, previously known as the Anchor Co-Inoculant Bacteria. This bacteria enhances the aroma profile and aromatic intensity by increasing fruity and floral aromas during co-inoculation.

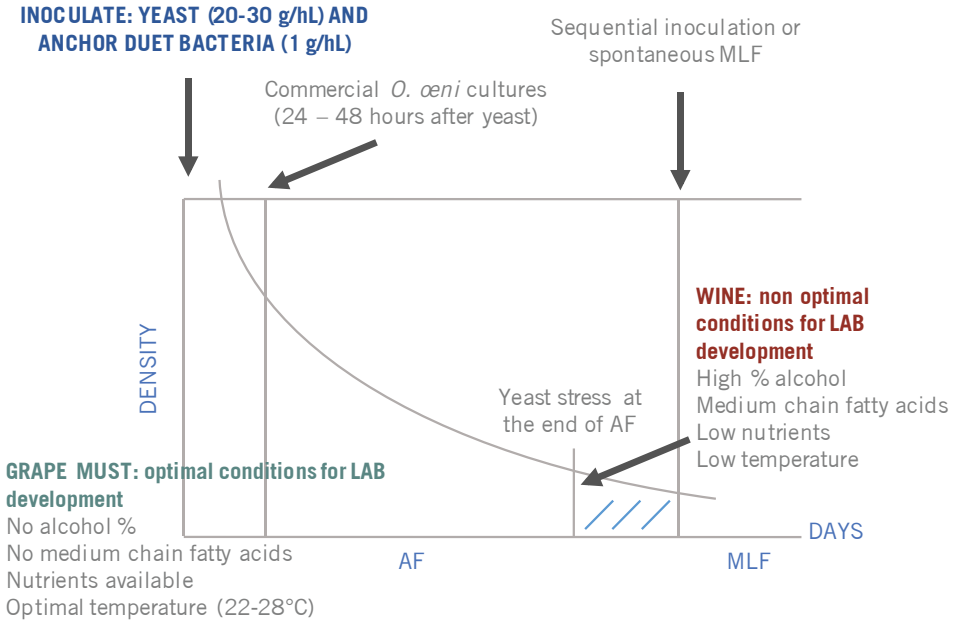
DUET SOFT
Oenococcus oeni/Lactobacillus plantarum
For an enhanced SOFTNESS and MOUTHFEEL during malolactic fermentation

ANCHOR DUET SOFT

Introducing Duet SOFT, previously known as the Anchor Co-Inoculant Bacteria 3.2. This bacteria enhances the softness and mouthfeel of the wines by decreasing green characters and astringency and enhancing dark fruit aromas during co-inoculation.

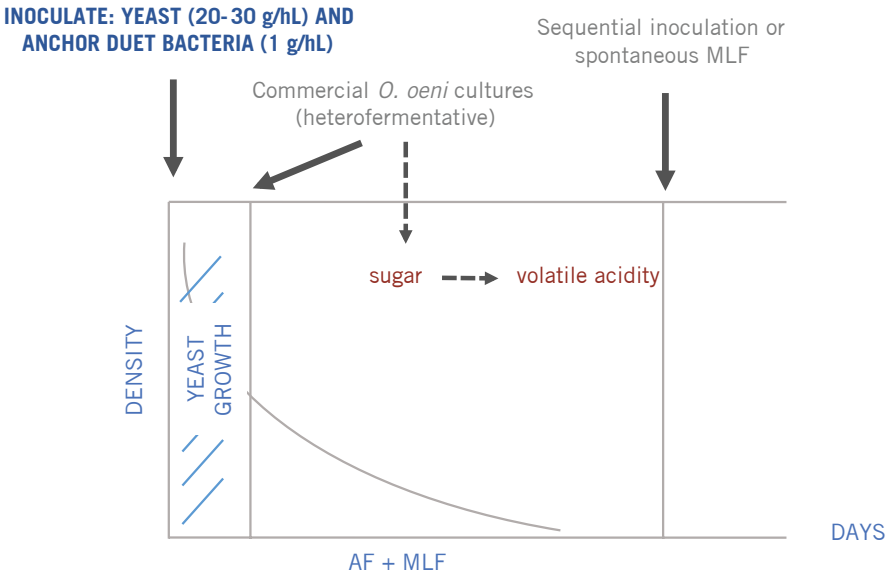
1. CO-INOCULATION – MUST VS. WINE CONDITIONS

The DUET range of bacteria is added at the beginning of fermentation (together with the yeast). This way, sequential conditions of high alcohol, inhibitory yeast compounds like short and medium chain fatty acids, low nutrient content and low temperatures are avoided.



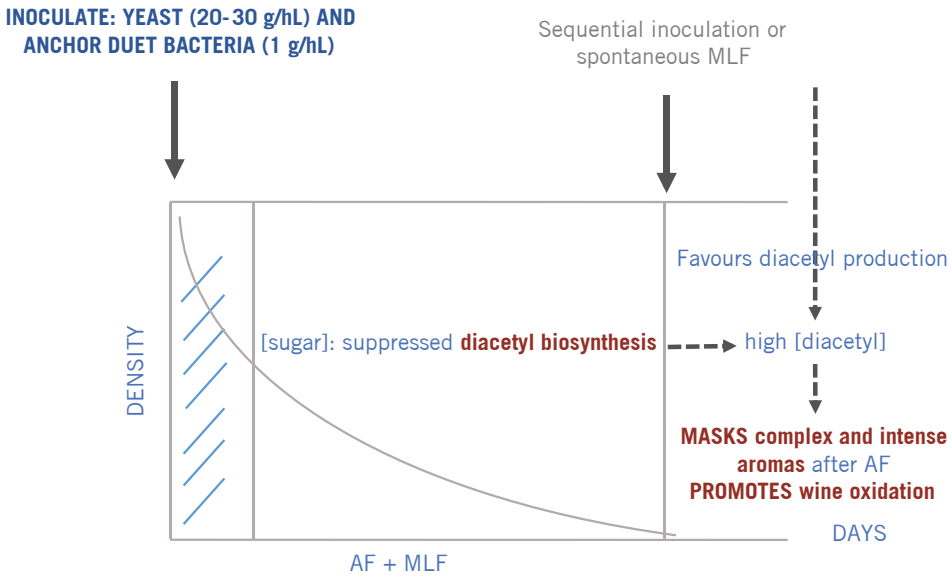
2. CO-INOCULATION – A BLEND OF BACTERIA

The DUET range of bacteria is a blend of a low volatile acidity producing *O. oeni* strain with a homofermentative *L. plantarum* strain. This reduces the volatile acidity produced in the wine.



3. IMPACT ON AROMA – LESS DIACETYL, BUTTERY CHARACTERS

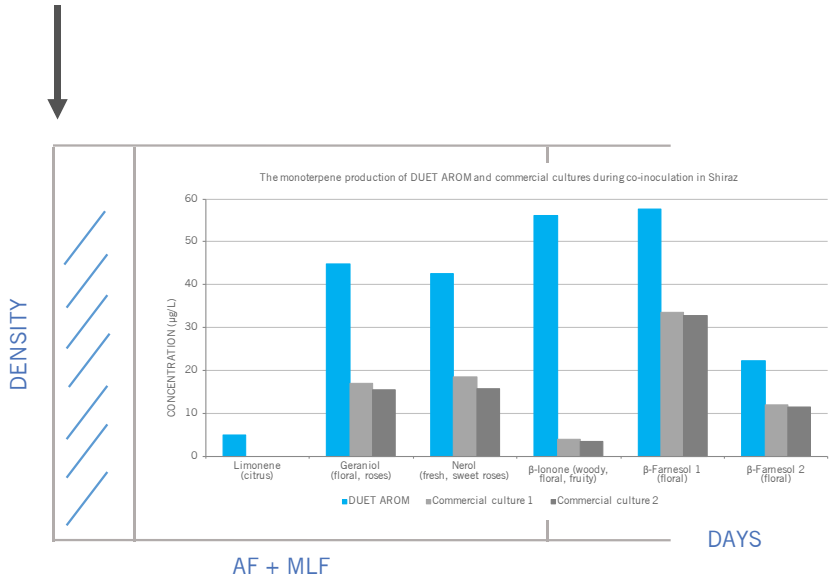
The DUET range is inoculated directly in the must. In a high sugar medium, the citric acid metabolism of the bacteria that produces diacetyl, is suppressed. Wines are therefore fresher and fruitier and less sensitive to oxidation.



4. IMPACT ON AROMA – ENZYMATIC ACTIVITY OF *LACTOBACILLUS PLANTARUM*

The *L. plantarum* strain displays *β*-glucosidase activity that releases glycosylated aroma compounds. In addition, iminopeptidase activity liberates bound amino acids, precursors for aroma production.

INOCULATE: YEAST (20-30 g/hL) AND ANCHOR DUET BACTERIA (1 g/hL)

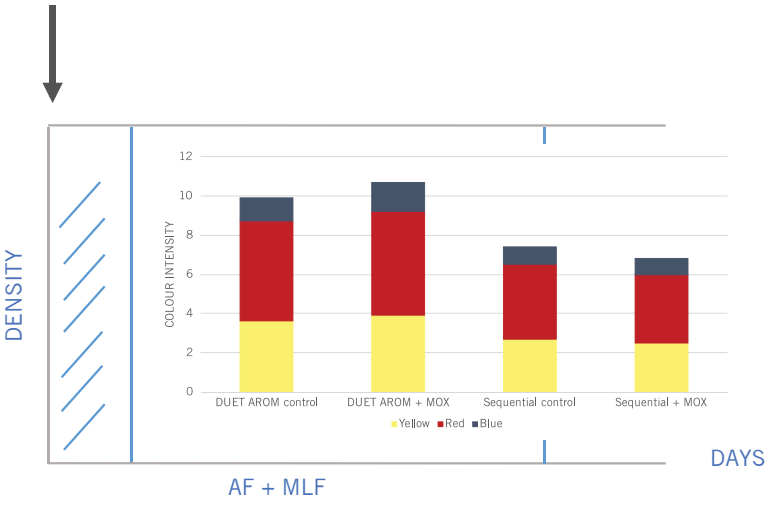


INCREASED COMPLEX AND INTENSE AROMA AFTER AF+MLF

5. DUET AROM – IMPROVE COLOUR IN RED WINES

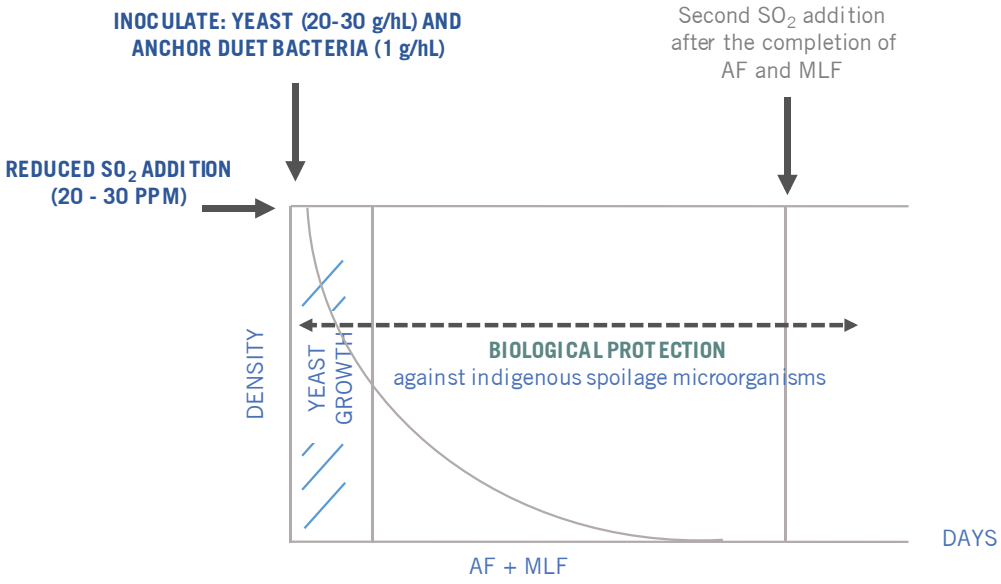
Co-inoculation with DUET AROM, together with micro- and macro-oxygenation during AF/MLF, increases the colour intensity in red wines.

INOCULATE: YEAST (20-30 g/hL) AND ANCHOR DUET BACTERIA (1 g/hL)



6. BIOLOGICAL PROTECTION – REDUCED SO_2 USAGE

The alcoholic and malolactic fermentations happen simultaneously and there is no window period for spoilage between the completion of AF and the start of MLF, as is the case with sequential inoculation.



SENSORY IMPACT OF THE DUET RANGE

	DUET AROM	DUET SOFT
AROMA ATTRIBUTES:	More fruit intensity	Enhanced mouthfeel
	More red berry aroma characteristics	Decrease in green characters
	Enhanced spicy notes	Reduced astringency
	Enhanced aroma intensity	Enhanced dark fruit aromas

PRODUCTION PROCESS, TRANSPORT AND STORAGE

Due to their unique production process, the Duet range of bacteria is robust and do not need to be kept frozen, unlike other commercial cultures. This is because the water activity (W_a) of the bacteria is extremely low and it is therefore less sensitive to temperature fluctuations. Transport of the bacteria can happen at room temperature without any negative impact on the bacteria or their performance. Bacteria can be kept between -18°C and 4°C.

CHAPTER 4: ENZYMES

INTRODUCTION

What are enzymes?

enzyme
noun
a substance produced by a living organism which acts as a catalyst to bring about a specific biochemical reaction

Enzymes are proteins that, whilst they do not get transformed themselves, can either facilitate or accelerate metabolic reactions and are substrate specific.

THE GRAPE CELL WALL

- Mainly consists of cellulose, hemicellulose and pectin.
- Responsible for filterability, clarity and viscosity of wines.
- Pectin, a structural polysaccharide consisting of a chain of various sugar molecules.
- Glucan, of which cellulose is an example, a polysaccharide consisting of glucose chains.
- Hemicellulose are shorter chain versions of cellulose and include sugars other than glucose.

Berries themselves contain enzymes, mostly involved in the ripening process, but these are not very active under winemaking conditions. The same applies to yeast-derived enzymes that are responsible for the fermentation process itself. Therefore commercial enzyme preparations can be utilised to enhance wine processing and/or quality. These enzymes are usually fungi-derived. Fungi produce a broader range of enzymes capable of polysaccharide degradation, as well as being active under winemaking conditions.

COMMERCIAL ENZYME PREPARATIONS

The addition of enzymes should occur as early as possible during the production process.

- Enzymes are not affected by 'normal' wine SO_2 levels or average wine pH levels.
- Enzymes are active at wine temperatures, but the activity increases with an increase in temperature, which will influence the dosage.
- Bentonite inhibits enzymes and should only be added after enzyme activity is no longer required.

Commercial enzyme preparations allow for more extracted and aromatic wines and accelerated winemaking processes.

Pectinases (extracted from *Aspergillus niger*)

Pectinases aid in extraction and include pectin lyase, pectin methyl esterase and polygalacturonase. These enzymes are responsible for:

- Breaking down cell walls
- Increasing anthocyanins and tannins
- Increased juice yield
- Enhanced settling, clarification and pressing
- Improved must quality
- Increased polyphenol content

Glycosidases (extracted from *Aspergillus niger*)

These enzymes increase the aromatic potential of the wine. Sugar-bound aroma molecules (especially terpenes responsible for fruity and floral aromas) are not volatile in the bound form. This enzyme allows for the release of these bound aroma compounds that will increase the aroma potential of the wine.

Glucanases (extracted from *Trichoderma harzianum*)

These enzymes facilitate improved yeast autolysis and increase the quantity of yeast cell wall compounds that are released. This will result in increased mouthfeel, polysaccharide and mannoprotein release that increase wine flavour and complexity.

Side activities: hemicellulase, cellulase, cinnamoyl esterase and anthocyanase

Side activities are produced as by-products during the production process of commercial enzyme preparations. These activities can either be beneficial or detrimental to the wine quality. Hemicellulase and cellulase are side activities as a result of pectinase production and are beneficial as enzymes that support the breakdown of the cell wall. Unwanted enzyme activities include cinnamoyl esterase (CE) that release precursors for volatile phenol production and anthocyanase that can result in colour loss in red wines.

DSM AS A WORLD-LEADER IN ENZYME SUPPLY

Rapidase enzymes specific to winemaking, are produced by DSM Food Specialties, a leading global manufacturer of food enzymes. The liquid and granulated enzymes in our range are produced in Seclin, in the north of France, a production facility with more than 100 years of production experience.

THE RAPIDASE BRAND

- Accelerators of winemaking processes - results and time saving.
- Tested and validated products - partnerships with important research institutes.
- One enzyme, one application - ease of choice and specific actions.
- A DSM product - traceability, quality, reproducibility.
- A historical brand - proud to be a pioneer, since 1922.

The Rapidase brand also consists of purified enzymes. The unwanted side activities produced as byproducts during the production process are removed. There are negligible levels of CE and anthocyanase in Rapidase commercial enzyme preparations.

ENZYME SELECTION

	Rapidase Expression Aroma	Rapidase Clear	Rapidase Clear Extreme	Rapidase Batonnage	Rapidase Extra Press
White and Rosé Wine	■	■	■	■	■
Red wine				■	
Liquid		■			■
Granulated	■	■	■	■	
PRIMARY ACTIVITY:					
Pectinases (primary chains)	■	■	■	■	■
β-Glucanases				■	
SECONDARY ACTIVITY:					
Pectinases (side chains)	■		■		■
Hemicellulases					■
Rhamno galacturonases					
Arabinosidases Rhamnosidases Apiosidases	■				

	Rapidase Flotation	Rapidase Extra Color	Rapidase Extra Color	Rapidase Fast Color	NEW PRODUCT Rapidase Filtration
White and Rosé Wine	■				■
Red wine		■	■	■	■
Liquid	■			■	■
Granulated		■	■		
PRIMARY ACTIVITY:					
Pectinases (primary chains)	■	■	■	■	■
β-Glucanases					■
SECONDARY ACTIVITY:					
Pectinases (side chains)		■	■	■	■
Hemicellulases		■	■	■	
Rhamno galacturonases		■	■	■	
Arabinosidases Rhamnosidases Apiosidases					■

ENZYMES FOR WHITE AND ROSÉ WINE APPLICATION

EXPRESSION AROMA

An enzyme for fast, early aroma precursor extraction in white grape maceration. Skin contact allows for enhanced aroma intensity and complexity. Rapidase Expression Aroma allows for targeted extraction of aroma precursors, such as thiols contained in grape skins, without extracting unwanted compounds. Sufficient skin integrity is maintained to ensure effective downstream processing.

AROMA PRECURSOR EXTRACTION IN WHITE WINES

APPLICATION:
- Skin and pulp cell wall degradation.
- Reduces maceration time.
- Replaces more oxidative mechanical methods.
- Increased thiol extraction.

USAGE: Add as early as possible at the crusher, in maceration or in the press. Use the maximum dosage for thick skinned grapes or early harvested fruit. Dilute 10 times prior to addition. Active from 10-45°C and the activity increases with temperature. Active within the wine pH range and normal concentrations of SO_2. Eliminated by bentonite.

DOSAGE: 2-4 g/100 kg

SKU: 100 G

CLEAR

This is an enzyme for fast and efficient grape must and wine clarification. Rapidase Clear decreases the viscosity allowing for more compact lees and clearer must and wine.

CLARIFICATION OF GRAPE MUST

APPLICATION:
- Pectin degradation.
- Decrease in lees percentage.
- Decrease in turbidity.

USAGE: Available in granulated or liquid formulation. Dilute 10 times prior to addition. Active from 10-45°C and the activity increases with temperature. Active within the wine pH range and normal concentrations of SO_2. Eliminated by bentonite and charcoal.

DOSAGE: 1-3 g/hL / 1-4 ml/hL

SKU: 100 G / 1 KG / 20 KG

CLEAR EXTREME

An enzyme for fast, efficient clarification of grape must in difficult and extreme conditions. The use of this enzyme allows for more compact lees and clearer must when settling conditions are difficult, including low temperatures, pH and/or hard to settle varieties.

CLARIFICATION IN DIFFICULT CONDITIONS

APPLICATION:
- Pectin and side chain degradation down to 6°C.
- Decreases viscosity.
- Promotes solid particle aggregation.
- Decrease in settling time and turbidity.
- Increase in clear juice percentage.

USAGE: Add as early as possible after pressing. Use the maximum dosage at temperatures below 10°C. Dilute 10 times prior to addition. Active from 10-50°C and the activity increases with temperature. Active within the wine pH range and normal concentrations of SO_2. Eliminated by bentonite and charcoal.

DOSAGE: 1-4 g/hL

SKU: 100 G

EXTRA PRESS

Enzyme for fast, efficient pressing of white grapes. Use of this enzyme allows for the release of juice from white grapes by weakening grape skins and reducing pectin water retention capacity.

EFFICIENT GRAPE PRESSING

APPLICATION:
- Pectin and insoluble protopectin degradation.
- Increases juice yield.
- Allows for softer and shorter pressing cycles and thus preserves grape must from oxidation.
- Increased percentage of free-run and press juice.

USAGE: Add as early as possible on grapes upon reception or after crushing in non-oxidative conditions. Avoid immediate draining after enzyme addition to allow distribution of the enzyme on the grapes. Use maximum dosage on whole cluster grapes. Dilute 10 times prior to addition. Active from 10-45°C and the activity increases with temperature. Active within the wine pH range and normal concentrations of SO_2. Eliminated by bentonite.

DOSAGE: 1.5-2.5 ml/100 kg

SKU: 20 KG

FLOTATION

Enzyme for fast, efficient flotation of white grape must. The use of this enzyme enables rapid viscosity decrease, allowing for faster migration of solid particles.

GRAPE MUST FLOTATION

APPLICATION:
- Soluble pectin degradation.
- Reduces flotation time.
- Promotes more compact foam by facilitating the accumulation of haze particles.
- Decrease in the percentage lees and turbidity.

USAGE: Add as early as possible after pressing. Use the maximum dosage for must with high pectin content and low maturity at harvest. Dilute 10 times prior to addition. Active from 10-45°C and the activity increases with temperature. Active within the wine pH range and normal concentrations of SO_2. Bentonite or silica gel should only be used as a flotation aid after allowing sufficient time for depectinization.

DOSAGE: 1-2 ml/hL

SKU: 5 KG

BATONNAGE

Enzyme for fast, early release of colloids in wines matured on lees.

ENHANCING YEAST AUTOLYSIS TO RELEASE MANNOPROTEINS

APPLICATION:
- Yeast cell wall degradation.
- Enhanced release of mannoproteins and other beneficial colloids like polysaccharides.
- Increases the mouthfeel and balance of the wine.

USAGE: On white wines (3 g/hL) and red wines (5 g/hL) with daily *batonnage* for a minimum of 30 days. Enhanced results can be obtained with an addition of 20 g/hL Extraferm yeast hulls. Dilute 10 times prior to addition. Active from 10-55°C and the activity increases with temperature. Active within the wine pH range and normal concentrations of SO_2. Eliminated by bentonite and charcoal.

DOSAGE: 3-5 g/hL

SKU: 100 G

RAPIDASE FILTRATION

NEW PRODUCT

Rapidase Filtration is a liquid enzyme formulation with a broad spectrum of hydrolases active on polysaccharides that slow and hinder the filtration of wines. It facilitates filtration by reducing wine clogging power, while safeguarding quality.

FACILITATE AND SPEED UP FILTRATION

APPLICATION:
- This liquid enzyme preparation displays pectolytic actions (specifically polygalacturonase and α-N-arabinofuranosidase) and β-glucanase activity.

USAGE: Add to the must or wine before filtration (with filtering layers, streaming, membrane, tangential filters) and mix well. Suitable for any type of wine: white or rosé; it can also be used on must and during secondary fermentation. At temperatures of 10-15°C, add 5-6 ml/hL for 6-7 days. At temperatures above 15°C, add 3-5 ml/hL for 3-5 days. If the presence of *Botrytis* glucans are confirmed, leave the enzyme in contact for at least two weeks at a temperature higher than 12-13°C. Active from 10-45°C, more active as temperature rises. Active in the wine pH range and in the presence of standard SO_2 concentrations. Can be removed with bentonite.

DOSAGE: 3-6 ml/hL

SKU: 1 KG

ENZYMES FOR RED WINE APPLICATION

EXTRA COLOR

Enzyme for fast, early colour extraction in red grape maceration. This enzyme allows for targeted extraction of colour and polyphenols contained in grape skins and reduces the requirement for more mechanical methods like punch-downs.

COLOUR AND POLYPHENOL EXTRACTION IN QUALITY MACERATION

APPLICATION:
- Grape skin cell wall degradation.
- Increased anthocyanin extraction.

USAGE: Add as early as possible at the crusher or in maceration. Use the maximum dosage for thick skinned grapes or early harvested fruit. Dilute 10 times prior to addition. Active from 10-50°C and the activity increases with temperature. Active within the wine pH range and normal concentrations of SO_2. Eliminated by bentonite.

DOSAGE: 2-4 g/100 kg

SKU: 100 G / 1 KG

EXTRA FRUIT

Enzyme for fast, early aroma precursor extraction in red grape maceration. This enzyme allows for targeted extraction of aroma precursors contained in red grape skins that enhance fruity characteristics.

AROMA PRECURSOR EXTRACTION IN RED WINES

APPLICATION:
- Skin and pulp cell wall degradation.
- Reduces maceration time.
- Increased roundness, raspberry and cherry characteristics.
- Reduced astringency and herbaceous characters.

USAGE: Add as early as possible during maceration. Use the maximum dosage on thick skinned grapes or in pre-ferment cold soaking (8-12°C) conditions. Best results will be obtained when adding an additional 1 g/100 kg two days after the initial dosage. Dilute 10 times prior to addition. Active from 10-50°C and the activity increases with temperature. Active within the wine pH range and normal concentrations of SO_2. Eliminated by bentonite.

DOSAGE: 2-4 g/100 kg

SKU: 100 G

FAST COLOR

Enzyme for fast colour and polyphenol extraction in short maceration processes. This enzyme has been specifically designed to process wines with a short maceration period. The subsequent processes of draining, pressing and clarification are also facilitated.

FAST COLOUR AND POLYPHENOL EXTRACTION DURING SHORT MACERATION

APPLICATION:
- Degradation of grape skin cell walls.
- Increase in anthocyanin concentration.

USAGE: Add as early as possible at the crusher or in maceration. Use the maximum dosage for grapes harvested early and less than three day maceration period. Active from 10-50°C and the activity increases with temperature. Active within the wine pH range and normal concentrations of SO_2. Eliminated by bentonite.

DOSAGE: 1-3 ml/hL

SKU: 5 KG

RAPIDASE FILTRATION

NEW PRODUCT

Rapidase Filtration is a liquid enzyme formulation with a broad spectrum of hydrolases active on polysaccharides that slow and hinder the filtration of wines. It facilitates filtration by reducing wine clogging power, while safeguarding quality.

FACILITATE AND SPEED UP FILTRATION

APPLICATION:
- This liquid enzyme preparation displys pectolytic actions (specifically polygalacturonase and α-N-arabinofuranosidase) and β-glucanase activity.

USAGE: Add to the must or wine before filtration (with filtering layers, streaming, membrane, tangential filters) and mix well. Suitable for any type of red wine; it can also be used on must and during secondary fermentation. At temperatures of 10-15°C, add 5-6 ml/hL for 6-7 days. At temperatures above 15°C, add 3-5 ml/hL for 3-5 days. If the presence of Botrytis glucans are confirmed, leave the enzyme in contact for at least two weeks at a temperature higher than 12-13°C. Active from 10-45°C, more active as temperature rises. Active in the wine pH range and in the presence of standard SO_2 concentrations. Can be removed with bentonite.

DOSAGE: 3-6 ml/hL

SKU: 1 KG

RAPIDASE FILTRATION

A NEW ENZYMATIC PREPARATION TO IMPROVE WINE FILTRATION BY TARGETING POLYSACCHARIDE COMPOUNDS

A unique, complex enzyme, Rapidase Filtration is a new product suitable for all filtration systems. Its liquid formulation allows it to be easily added and mixed with wine at any time during the winemaking process and it is effective even in challenging conditions, such as very low pH and high sulphite levels.

Thanks to its specificity, Rapidase Filtration acts only on targeted molecules and does not affect the quality of the wine. In addition, unwanted side activities have been tested and kept at naturally low levels, with no significance from a winemaking or quality perspective. This new product offers direct benefits in terms of wine filtration, as well as indirect benefits in terms of filter maintenance and longevity.

HOW DOES IT WORK

Rapidase Filtration contains high polygalacturonase and α-N-arabinofuranosidase activity, obtained from selected strains of *Aspergillus niger* and endo-1,3(4)-β-glucanase obtained from a selected strain of *Talaromyces emersionii*, as well as secondary activities derived from standard microorganism metabolism and retained by the finished product. Activities from *Aspergillus* allow the degradation of both simple and complex pectic polysaccharide chains, while glucanase activity leads to the degradation of any glucans, mainly from *Botrytis* contaminated grapes.

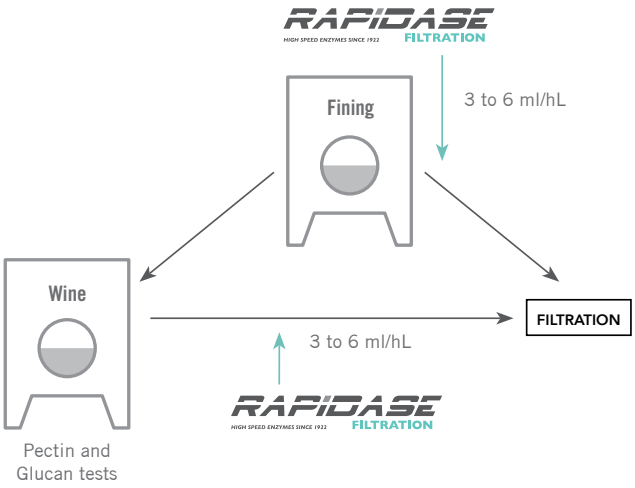
TEST CONDUCTED IN RED WINE

The wine used for the test was a Merlot produced in central Italy by a medium-sized cellar. The wine was divided into two 100 hL tanks; 5 ml/hL of the enzyme was added to one of the two tanks. The contact time was about 14 days and the temperature was around 15°C. Subsequently, the wine from both tanks were subjected to separate filtrations using a hollow fibre crossflow. For the enzymated wine, the following differences were noted:

- when processing was complete, the filter was much cleaner;
- work continued seamlessly to the end, while in the case of the control sample wine, filtration had to be interrupted to carry out a wash cycle;
- flow for both samples were 17 hL/h, constant throughout the cycle; for the non-enzymated wine, the flow progressively decreased and a wash cycle was required, while filtration of the enzymated wine continued without interruption to the end.

RECOMMENDED USE OF RAPIDASE FILTRATION

Rapidase Filtration is a liquid enzyme formulation with a broad spectrum of hydrolases active on polysaccharides that slow and hinder the filtration of wines. It facilitates filtration by reducing the clogging effect of the wine on filters, while safeguarding quality.



Recommended use:

- Temp. 10-15°C: 5-6 ml/hL for 6-7 days
- Temp. > 15°C: 3-5 ml/hL for 3-5 days
- With positive glucan test: 2 weeks contact time at temp. > 12°C

For each sample, the polysaccharides present in the different wine fractions collected during the test were quantified; Figure 1 shows the quantities for the different classes of the most significant polysaccharides for testing purposes.

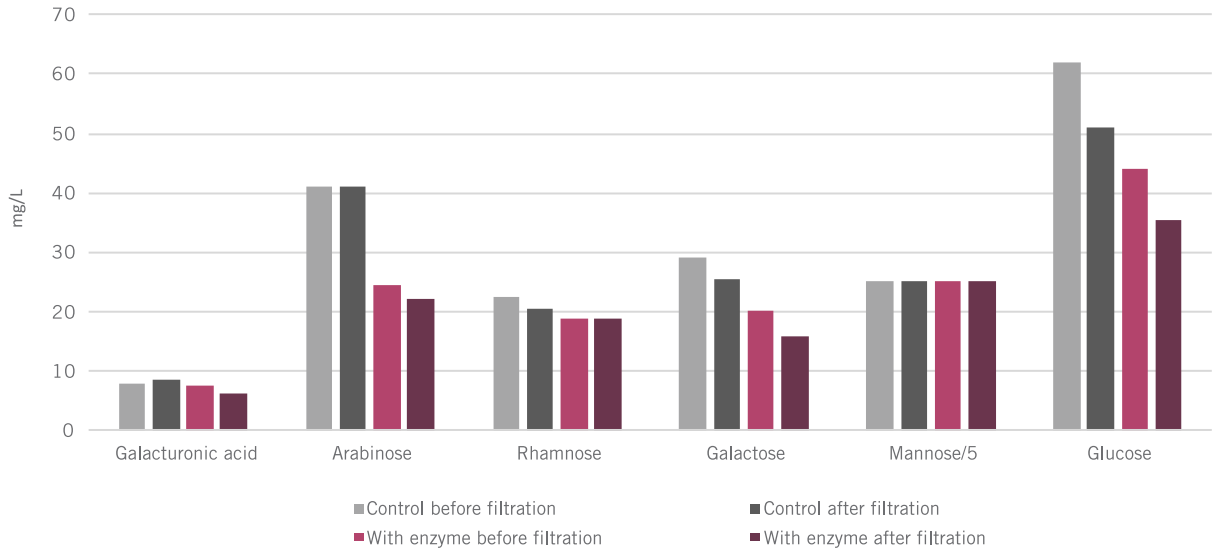
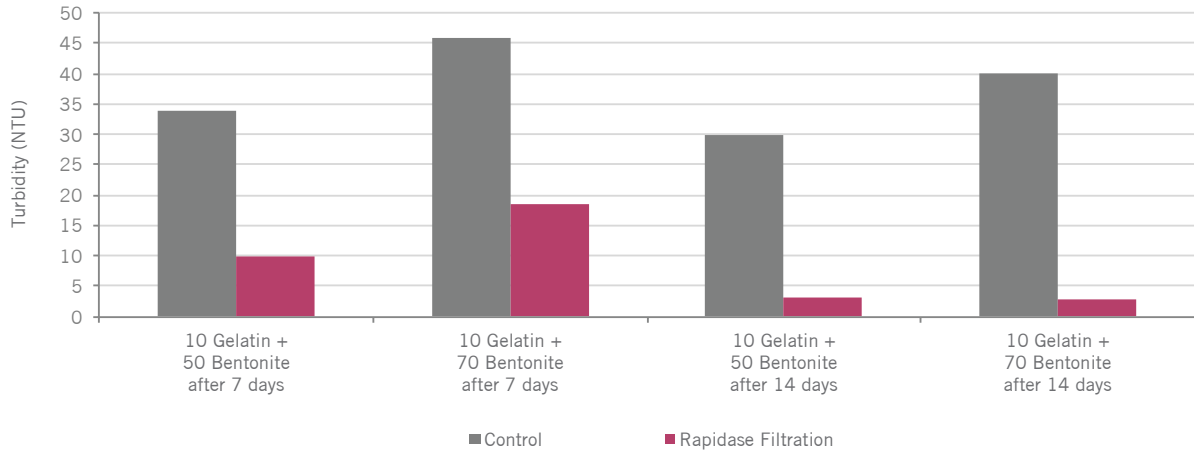


Figure 1. Polysaccharide analysis in the control sample wine before and after filtration and in the enzymated wine before and after filtration.



This figure shows the effect of Rapidase Filtration, added at 5 ml/hL, 10 days before the fining process, in a red wine with an initial turbidity level of 243 NTU in comparison with no enzyme treatment. The test was done in northern Italy in a cooperative winery. The fining process includes a combination of gelatin and bentonite at various doses - in g/hL (dry matter) - and the turbidity was measured 7 and 14 days after the fining. We can see that Rapidase Filtration allows for a better fining effect with lower dosage of the fining agents.

ANALYSES HIGHLIGHT THE FOLLOWING FACTS:

- only small amounts of linear pectic chains (homogalacturonans) are present in this wine and are therefore barely affected by the presence of the enzyme;
- pectin arabinan side chains are hydrolysed by 50%;
- RG-II was not really affected by the enzyme, but for practical purposes, it showed no clogging effect on the filters;
- galactans were partially hydrolysed by the enzyme and about 50% was then removed by filtration;
- mannoproteins are not hydrolysed by the enzyme; nor did filtration affect the mannoprotein fraction;
- glucans were significantly hydrolysed by the enzyme, with a reduction of 30% before filtration and values almost halved after filtration. This enzymatic action was the one which influenced filtration performance the most;
- insignificant amounts of xyloglucans and xylans are present in the wine (data not shown on the chart).

CONCLUSIONS

From all the tests conducted so far, the use of Rapidase Filtration brought significant advantages:

1. enhanced filtration flow, more evident if there are any clogging problems attributed mainly to glucans or complex pectic polysaccharides. In this case, it was possible to filter larger wine volumes without having to wash filters;
2. better filterability index, especially when the control sample wine shows high indices. In situations of trouble-free filtration, benefits can be seen during analysis;
3. in many cases, filters are found to be cleaner, with long term benefits for filter longevity and processing time;
4. an option for the filtration of wines that quickly clog filters, as in the case of wines made from unhealthy grapes or wines rich in polysaccharides;
5. the enzyme can be used in a wide variety of conditions (pH, sulphites, type of wine, temperature, alcohol content);
6. no organoleptic impact, even when adding larger amounts of enzyme;
7. the enzyme can also be used in primary and secondary fermentations, without affecting fermentation kinetics.

CHAPTER 5:
FERMENTATION TANNINS

INTRODUCTION

What are tannins?

tannin

noun

a tannin (or tannoid) is an astringent, polyphenolic organic molecule that binds to and precipitates proteins and various other organic compounds including amino acids and alkaloids and consists of derivatives of gallic acid

There are three classes of flavonoids in grapes and wine: anthocyanins, flavonols and tannins. Tannins include a range of polyphenolic compounds and add bitterness and astringency, body and mouthfeel and influences colour stability by forming polymeric complexes with anthocyanins. There are two types of tannins: hydrolysable (usually found in commercial tannin products) and condensed tannins that are grape-derived. Grape-derived tannins see their main synthesis happening in the seeds immediately after fruitset and reaching a maximum concentration at *veraison*.

The influence of winemaking practices on the phenolic structure:

ACTION:	EFFECT:
crushing	vigorous crushing favour extraction of astringent and bitter tannins
whole cluster or destemmed berries	whole cluster fermentation increases total polymeric phenol content
carbonic maceration	decreased phenol extraction
cold maceration	increased anthocyanin:tannin ratio
yeast strain	no significant effect on phenol composition
maceration temperature	increased temperature increases colour extraction: 30°C is optimal for extraction of anthocyanins and formation of stable polymers
fermentation cap management	mechanical punch-down and pump-overs enhance extraction of all phenolic compounds compared to manual punch-downs; rotor treatments result in higher total polyphenol content and quality compared to pump-overs
SO_2 levels at crushing	no significant impact on anthocyanin content
processing enzymes	enzyme treatments may increase the initial release of pigments during fermentation; the use of a purified enzyme will minimise the risk of anthocyanase that could reduce colour
extended maceration	increased polyphenol extraction with increased skin contact time; need to balance complexity and colour intensity with acceptable bitterness and astringency
addition of grape tannin	addition of seed tannin increases colour stability, colour intensity and free anthocyanins
fining treatments	PVPP, gelatine and bentonite reduce phenolic levels
micro-oxygenation	results in higher total phenols concentration retained by stabilisation of anthocyanins through polymerisation; tannins evolve and soften and add body to lightly structured wines

When grape tannins are found to be insufficient, possible commercial tannin sources include:

- Oak (American, European, toasted and untoasted)
- Chestnut
- Grape (skin and seed)
- Exotic wood
- Gall nuts

Ellagic tannins refer to those tannins from an oak/chestnut source, whereas proanthocyanidins refer to tannins sourced from grapes or exotic woods. During the development of commercial tannins like the Scott'Tan range, it is imperative to understand, especially via tasting, the mouthfeel, relative astringency and roundness imparted by a specific tannin.

TIMING OF ADDITION

Tannins should be added early in the fermentation. For red wine production addition at the crusher or first pump-over will depend on the sanitary state of the grapes (anti-oxidative application). For better integration (enhancing structure and colour stability application), addition during fermentation is advised. Add tannins to white wine fermentations at the crusher or during mixing.

Tannins for white wine applications can be added to juice (fermentation tannins) and wine (cellaring and ageing tannins) and can:

- Remove off-odours
- Facilitate clarification
- Inhibit oxidising enzymes like laccase
- Act as anti-oxidant
- Improve mid-palate, structure and softness

Similarly, tannins for red wine applications can:

- Increase colour stability
- Enhance phenolic structure
- Limit oxidation, also during barrel maturation
- Increase structure and freshness
- Facilitate SO_2 management

FERMENTATION TANNIN SELECTION

	Scott'Tan FT Blanc	Scott'Tan FT Blanc Soft	Scott'Tan FT Blanc Citrus
Composition	**gallotannin (oak gall nut)**	**gallotannin (oak gall nut)**	**condenced tannin from citrus wood and gallic tannins**
Properties	reactive with proteins prevents browning	reactive with proteins prevents browning	protects against oxidation
Application	improves clarification and structure minimises reductive odours inhibits laccase (*Botrytis*)	improves clarification and structure minimises reductive odours inhibits laccase (*Botrytis*) enhances mouthfeel	used in combination with yeast with β-glycosidase activity, will enhance aromas such as lemon, grapefruit, apple and white flowers
White	■	■	■
Rosé	■	■	■
Red			
Promotes colour, body and fruit			
Protects from oxidation	■	■	■
Enhances mouthfeel		■	■
Enhances structure			■
Enhances mid-palate volume			
Stabilises colour			■
Enhances fruit character			
Protects against rot	■	■	■
Enhances ageing potential	■	■	

	Scott'Tan FT Rouge	Scott'Tan FT Rouge Soft	Scott'Tan FT Rouge Berry
Composition	**proanthocyanidins and ellagic tannin (oak and chestnut hardwood)**	**proanthocyanidins and ellagic tannin (oak)**	**Condensed tannin from red berry fruit**
Properties	highly reactive with proteins promotes colour stability enhances structure and ageing potential strong anti-oxidant	reactive with proteins promotes colour stability enhances structure and ageing potential anti-oxidant	promotes colour stability prevents oxidation of primary aromas
Application	stabilises colour and enhances structure inhibits laccase (*Botrytis*) and protects anthocyanins from rot	stabilises colour and enhances structure inhibits laccase (*Botrytis*) and protects anthocyanins from rot	red berry characters
White			
Rosé			■
Red	■	■	■
Promotes colour, body and fruit	■	■	■
Protects from oxidation			
Enhances mouthfeel			
Enhances structure	■	■	■
Enhances mid-palate volume			■
Stabilises colour	■	■	■
Enhances fruit character			■
Protects against rot	■	■	■
Enhances ageing potential	■	■	■

PRODUCT CATALOGUE

FERMENTATION TANNINS FOR WHITE WINE

FT BLANC

This is a white gall nut tannin specifically formulated for use on grapes with mould or rot (*Botrytis*).

PROTECTS FROM OXIDATION

APPLICATION:
- Protects juice from browning.
- Inhibits laccase activity.
- An effective anti-oxidant on healthy grapes.
- Can help remove proteins in protein-rich varieties like Sauvignon blanc.
- Potentially contributes mineral notes.

USAGE: Add by sprinkling directly on the grapes at crushing or add to the juice or wine during a tank mixing.

DOSAGE: 5-15 g/hL

SKU: 1 KG

FT BLANC SOFT

Similar to FT Blanc in application, but also enhances softness and improved mouthfeel.

PROTECTS FROM OXIDATION AND ENHANCES MOUTHFEEL

APPLICATION:
- Enhances texture and perception of sweetness on the palate.
- Contributes to minerality in wine.

USAGE: Add by sprinkling directly on the grapes at crushing or add to the juice or wine during a tank mixing. A small addition (2.5-5 g/hL) may help mask the perception of bitterness in finished wines.

DOSAGE: 5-15 g/hL

SKU: 1 KG

FT BLANC CITRUS

This is a mixture of condensed tannins extracted from citrus wood and gallic tannins. When used in combination with yeast strains that display marked β-glycosidase activity (Alchemy II, VIN 2000 and VIN 13), it allows for the development of enhanced aromatic potential.

DEVELOPS ENHANCED AROMATIC POTENTIAL

APPLICATION:
- Intense aromas of lemon, grapefruit, apple and white flower.
- Complements varietal and fermentation aromas.
- Protects must and wine from oxidation.

USAGE: Add during alcoholic fermentation, within 24-48 hours after yeast inoculation.

DOSAGE: 2-15 g/hL

SKU: 1 KG

FERMENTATION TANNINS FOR RED WINE

FT ROUGE

This is a proprietary tannin that is a blend of highly reactive tannins derived from exotic woods and chestnut. This acts as a 'sacrificial' tannin allowing for the preservation of the grape's natural tannins so they can combine with anthocyanins to create optimal colour stability.

PROMOTES COLOUR, BODY AND FRUIT

APPLICATION:
- Optimal colour stability.
- Anti-oxidative.
- Inhibits oxidative enzymes like laccase and prevents browning.

USAGE: Gradually sprinkle directly on grapes at the crusher or add to must during pump-over. If subsequent additions are desired, add in increments of 5 g/hL.

DOSAGE: 20-50 g/hL

SKU: 1 KG / 5 KG

FT ROUGE SOFT

This is a proprietary tannin specifically formulated for its gentle impact. It is particularly suited for Pinot noir and early release wines.

PROMOTES COLOUR, BODY AND FRUIT AND IMPROVES MOUTHFEEL AND ROUNDNESS

APPLICATION:
- Reactive with natural grape proteins and helps promote optimal colour and colour stability.
- Enhances structure.
- Improves mouthfeel and roundness.
- Reduces bitter characters.
- Anti-oxidative.

USAGE: Gradually sprinkle directly on grapes at the crusher or add to must during pump-over. If subsequent additions are desired, add in increments of 5 g/hL.

DOSAGE: 20-50 g/hL

SKU: 1 KG

FT ROUGE BERRY

This is a mixture of condensed tannins extracted from the wood of red berry fruit. Its use in combination with yeast strains with a marked β-glycosidase activity like NT 116, allows for the development of enhanced red berry characteristics.

PROMOTES RED BERRY NOTES

APPLICATION:
- Intense aromas of cherry, strawberry and blueberry.
- Complements varietal aromas produced during fermentation.
- Promotes stabilisation of colour.
- Prevents oxidation of primary aromas.

USAGE: Add at the first pump-over or punch-down or 24-48 hours after yeast inoculation. Dissolve in 10 times its weight in water before adding.

DOSAGE: 2-15 g/hL (rosé) and 5-20 g/hL (red)

SKU: 1 KG

CHAPTER 6:
WINE PRESERVATIVES

INTRODUCTION

Lysozyme is an:

- Enzyme (protein) isolated from egg whites.
- Lyse gram-positive bacteria and thereby inhibiting their growth.
- Lactic acid bacteria (LAB), *Oenococci*, *LactobaciIli* and *Pediococci* are gram-positive.
- Acetic acid bacteria are gram-negative and are unaffected by lysozyme.
- Lysozyme also has no influence on wine yeast or fungi.

Factors influencing lysozyme activity:

- pH, temperature and bacterial cell counts.
- Only impact on populations < $1x10^5$ cells/mL.
- Concentration of enzyme added.
- Timing of addition.

LYSOZYME ACTIVITY OVER TIME

Lysozyme activity in wine is unstable. It decreases faster in red wine than in white wine due to the presence of polyphenols. If lysozyme is added at the start of a red wine fermentation there will be no activity after 7 - 14 days. If lysozyme is added after fermentation then residual activity can be present, even after a few months.

IMPACT ON RED WINE COLOUR

Lysozyme can have an influence on red wine colour since it is able to bind polyphenols. The effect can differ from wine to wine and is dependent on the tannin concentration and the dosage of lysozyme used (100 – 200 mg/L has no effect). It is therefore necessary to conduct laboratory trials before the addition of lysozyme to a finished wine. When lysozyme is used during fermentation then the effect on colour will be negligible.

USING BENTONITE AND LYSOZYME

Since lysozyme is a protein it cannot be used in the presence of bentonite. The use of lysozyme can also increase the protein instability. The following components will bind to lysozyme and precipitate it: tannins and polyphenols, wood chips, activated carbon and silica sol. Lysozyme is thus not a permanent preservative and cannot replace SO_2 since it has no anti-oxidative function. It is merely an aid to control LAB in situations where SO_2 alone is not effective.

DELVOZYME

Delvozyme is an enzyme preparation based on lysozyme. Delvozyme can be applied on red, white and rosé wines.

RECOMMENDED DOSAGE

LYSOZYME APPLICATION:	DOSAGE:	IMPACTS:
prevents bacterial spoilage during alcoholic fermentation	100-150 mg/L before fermentation	avoids and limits proliferation of spoilage bacteria and reduce the risk of increased volatile acidity, production of unpleasant taste or aroma compounds and nutritional competition
preventing spoilage at the end of lagging or sluggish alcoholic fermentation	250-350 mg/L at the sign of a lagging fermentation	prevents LAB growth and volatile acidity formation in sluggish fermentations
controlling the onset of malolactic fermentation	100 mg/L before fermentation delay MLF by ±10 days	minimises the risk of MLF starting before AF: vinification of whole grape clusters or maceration with high pH
complete inhibition of MLF	300-500 mg/L after settling	prevents MLF
microbiological stabilisation after MLF	150-250 mg/L after MLF	controls LAB population and avoid unwanted organoleptic defects
preventing LAB spoilage during barrel ageing	100-150 mg/L at the beginning of barrel ageing	kills LAB and prevents the increase of volatile acidity during ageing

USAGE: Dissolve Delvozyme in 10 times the amount of warm water (20°C) and allow to stand for 40 to 45 minutes and then mix thoroughly. Evenly distribute in the treated must. Allow for one week of contact time and one week before bottling after Delvozyme treatment.

DOSAGE: 100-500 mg/L

SKU: 1 KG

CHAPTER 7:
AGEING AND FINISHING

INTRODUCTION

AGEING

There are approximately 800-1000 compounds in wine. The critical step of ageing before bottling can occur in tank, barrel or vats and is a process that needs to be carefully monitored by the winemaker over a period of 8-24 months or more, depending on the wine style and winemaker preference. The biggest changes during this process are due to modifications in tannins, texture, colour, flavour and aroma compounds. This process allows the wine's aromatic profile to become more developed and the structure more complex.

Ageing allows for the tannins to soften and become less astringent. The perception of acids change due to esterification and various tertiary aromas develop due to the hydrolysis of flavour precursors. As a result, the wine bouquet becomes more developed and multi-layered. The most important chemical reactions during wine ageing include oxidative processes, as well as non-oxidative reactions, like esterification, ester hydrolysis, etherification, Maillard reactions and glycoside hydrolysis.

Some processes to consider during the ageing period include:

- topping up the wine to avoid oxidation;
- the number of times the wine is racked off the lees is decided by the winemaker and helps with the development of delicate aromas;
- for white wines, whether to age on lees, as well as the amount of time and duration of stirring the lees can improve the mouthfeel of the wine, as well as increase aromatic complexity;
- the addition of cellaring tannins can improve fruit characters, as well as adjust structural imperfections like a lack of mid-palate, structure, mouthfeel or finish;
- ageing the wine in barrels will boost the aromatic profile and impart oak character, while vats preserve the youth and freshness of the wine.

Following the ageing and cellaring period, optional fining and filtration occurs prior to bottling.

FINING, STABILISATION AND BOTTLING

- **Fining** – treatments done at the correct time, can enhance the clarity, as well as filterability of the wine. It is recommended that fining takes place 6-9 weeks before bottling.
- **Filtration** – dependant on contact and settling time of fining agents.
- **Finishing wines** – final adjustments are ideally to be made 6-9 weeks prior to bottling. These can include blending, as well as the additions of finishing tannins to enhance aroma, fruit or mouthfeel characteristics.

Wine instability can originate from various sources, including microbial, chemical and colloidal. It is very important that final blends and the necessary adjustments are done prior to stability checks. The most important stability checks for white and rosé wines include: oxidation, pinking, protein, tartrate and microbial stability. The most important stability checks for red wine include colour, tartrate and microbial stability.

- **oxidative stability**: especially important for white and rosé wines, including pinking potential. It is important to prevent oxidation-related colour changes, rather than treat them later.
- **protein stability**: changes in the parameters of temperature, alcohol and pH can influence protein solubility and lead to precipitation and undesirable haze formation. Bentonite fining trials will indicate the amount required for the degree of stability desired based on the winemaker's goal, exposure to heat and expectations from the consumer. Largely problematic in white and rosé wines and young red wines with low tannin content treated with protein fining agents. Sodium-based bentonites have a better protein removal capacity, while calcium-based bentonites have a better compacting capacity. Bench trials for stability and compaction are highly recommended.
- **tartrate stability**: usually more important in white and rosé wines, as the ageing process allow red wines to sometimes naturally achieve stability. Stabilisation via inhibition prevents the nucleation and crystal growth, while increasing the solubility of KHT in your wine. All final blends, stabilisations, acid adjustments and concentrate additions need to be completed before tartrate stabilisation via inhibition.
- **colloidal stabilisation**: stabilisers can effectively stabilise colour and should be added 24-72 hours prior to bottling and the filterability should be confirmed after addition. Stabilising wine reduces the risk of haze or precipitation.
- **microbial stability**: mainly ensured via sterile filtration at bottling, usually with the use of 0.45 µm membrane filters, but requires clarification and pre-filtration.

A final filtration before bottling will make the wine less prone to oxidation and microbial problems.

FINISHING TANNIN SELECTION

	Tannin Estate	Tannin Refresh	Tannin Riche	Tannin Riche Extra	FT Blanc Citrus	FT Rouge Berry
Composition	**Proprietary tannin for barrel ageing**	**Proprietary tannin extracted from 100% French oak**	**Derived from 100% toasted French oak**	**Proprietary tannin specifically developed from 100% American oak**	**Condenced tannin from citrus wood and gallic tannins**	**Condensed tannin from red berry fruit**
Application	Mid-palate volume	French oak character for neutral barrel cellaring	French oak character and perception of sweetness	Smooth vanillin American oak qualities	Will enhance aromas such as lemon, grapefruit, apple and white flowers	Red berry characters
White						
Rosé						
Red						
Better structure						
Enhances mouthfeel						
Fuller mid-palate						
French oak character						
American oak character						
Vanillin oak character						
Enhances fruit character						
Better ageing potential						
Perception of sweetness						
Lowers the perception of alcohol						

PRODUCT CATALOGUE

AGEING/CELLARING TANNINS

TANNIN ESTATE

This is a tannin specifically formulated to compensate for the lack of tannins, without the 'dryness' associated with barrels.

MID-PALATE VOLUME IN RED WINES

APPLICATION:

- Compensate for lack of tannins.
- Enhances mid-palate and complexity.
- Provides a measure of anti-oxidant protection.
- Fruit characters can be enhanced.
- Recommended when using older, tannin-depleted barrels.

USAGE: During transfer or racking, add Tannin Estate to the wine. Mix well to assure homogeneity. Additions may be made during the first two to three rackings, followed by organoleptic evaluation. Final additions should be made three to six weeks before bottling to allow for complete polymerisation and settling.

DOSAGE: 5-30 g/hL (prior to barrel ageing) and 5-10 g/hL (3-6 weeks prior to bottling or during rackings)

SKU: 1 KG

TANNIN REFRESH

This is a tannin extracted from 100% French oak and will add wood nuances, especially useful when older barrels are used during ageing.

FRENCH OAK CHARACTER FOR NEUTRAL BARREL CELLARING IN RED, WHITE AND ROSÉ WINES

APPLICATION:

- It will contribute wood nuance without smoky or toasty characters.
- Especially useful when old barrels are used during aging.
- A strong anti-oxidant.
- Help preserve colour.
- Increase the complexity of the wine's finish.

USAGE: Gradually add Tannin Refresh to the wine during a transfer or during racking. After the addition of Tannin Refresh it is recommended to proceed with normal rackings until fining. In young wines kept in tank, Tannin Refresh should be added immediately after malolactic fermentation. If malolactic fermentation is not desired, add immediately after alcoholic fermentation.

DOSAGE: 3-20 g/hL

SKU: 500 G

TANNIN TRIAL PROTOCOL

BENCH TRIAL PREPARATION

Prepare a 2.5% solution of Scott'Tan tannin by mixing 2.5 g of tannin with 80 mL of de-ionized water in a 100 mL measuring cylinder. Once combined, bring the volume up to 100 mL.

Recommended addition per 750 mL bottle:

Dosage:	mL of 2.5% solution:
3 g/hL	0.9 mL
5 g/hL	1.5 mL
7 g/hL	2.1 mL
10 g/hL	3 mL

Alternatively, we now offer finishing kits with liquid tannin and stability agents for ease of trials.

By making use of our finishing kits, you can potentially:

- mask pyrazines/greenness;
- maximise fruit;
- boost/increase mid-palate;
- increase aromatic intensity;
- increase body;
- help minimise the impact of *Brettanomyces;*
- brighten the perception of acid;
- impart oaky characteristics;
- increase the perception of sweetness.

Contact your Technical Sales Manager today!

PRODUCT CATALOGUE

FINISHING TANNINS

TANNIN RICHE

This is a tannin derived from 100% toasted French oak notable for enhancing complexity.

FRENCH OAK CHARACTER AND PERCEPTION OF SWEETNESS IN RED, WHITE AND ROSÉ WINES

APPLICATION:
- Enhancing complexity.
- Imparts hints of coconut and vanilla together with a perception of sweetness.
- Contribute the final touch to your wine.

USAGE: Gradually add Tannin Riche into the wine during transfer or mixing, mixing well to achieve homogeneity. After additions with Tannin Riche continue racking as usual. Final addition should be made at least three weeks prior to bottling.

DOSAGE: 3-7 g/hL (white and rosé wines) and 3-15 g/hL (red wines)

SKU: 500 G

TANNIN RICHE EXTRA

This tannin is specifically developed from 100% American oak and will add to wood nuanced, but with a heightened perception of vanillin oak character.

SMOOTH VANILLIN AMERICAN OAK QUALITIES IN RED AND WHITE WINES

APPLICATION:
- Contributes nuances similar to Tannin Riche but with heightened perception of vanillin oak character.
- Works well in conjunction with low doses of other tannins (e.g. Tannin Estate, FT Blanc).
- Help smooth a wine's finish.

USAGE: Dissolve Tannin Riche Extra in 10 times its weight in warm water (35-40°C) then add it to the wine and mix well. Good homogenization is important. Final additions should be made at least three weeks prior to bottling. After additions, proceed with normal racking.

DOSAGE: 5-10 g/hL (white wines) and 5-20 g/hL (red wines)

SKU: 500 G

FT BLANC CITRUS

This is a mixture of condensed tannins extracted from citrus wood and gallic tannins. It allows for the development of enhanced aromatic potential.

DEVELOPS ENHANCED AROMATIC POTENTIAL

APPLICATION:
- Intense aromas of lemon, grapefruit, apple and white flower.
- Complements varietal and fermentation aromas.
- Protects wine from oxidation.

USAGE: Gradually add FT Blanc Citrus into the wine during transfer or mixing, mixing well to achieve homogeneity. After additions with FT Blanc Citrus continue racking as usual. Final addition should be made at least three weeks prior to bottling.

DOSAGE: 2-15 g/hL

SKU: 1 KG

FT ROUGE BERRY

This is a mixture of condensed tannins extracted from the wood of red berry fruit. It allows for the development of enhanced red berry characteristics.

PROMOTES RED BERRY NOTES

APPLICATION:
- Intense aromas of cherry, strawberry and blueberry.
- Complements varietal aromas.
- Promotes stabilisation of colour.
- Prevents oxidation of primary aromas.

USAGE: Dissolve FT Rouge Berry in 10 times its weight in warm water (35-40°C) then add it to the wine and mix well. Good homogenization is important. Final additions should be made at least three weeks prior to bottling. After additions, proceed with normal racking.

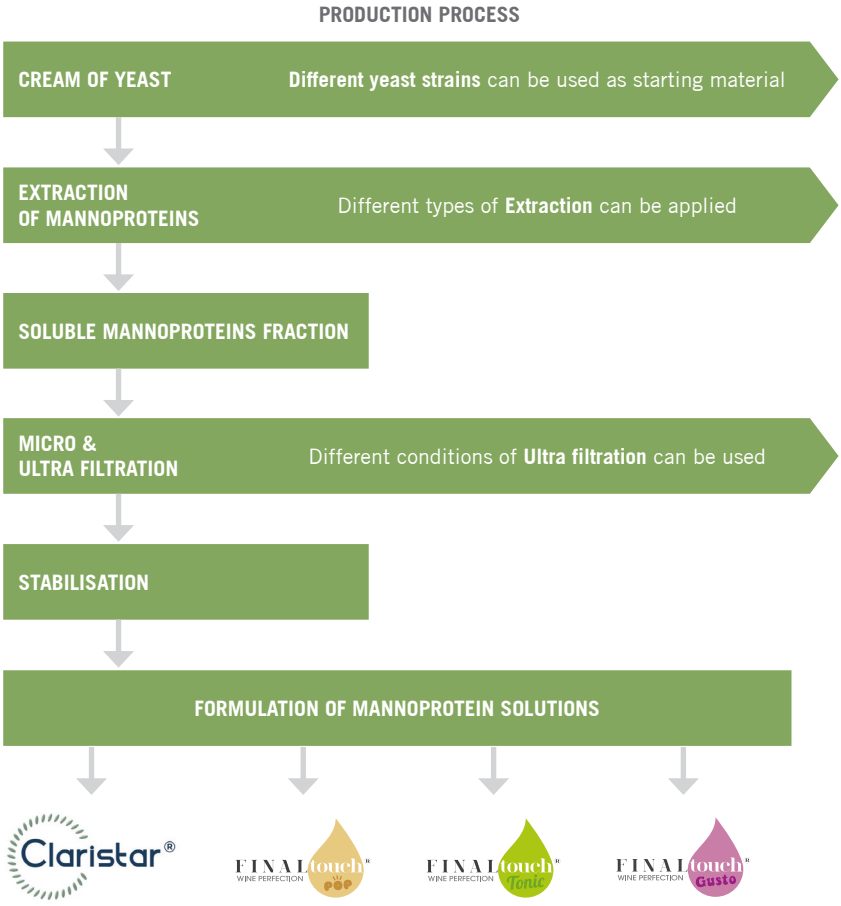
DOSAGE: 2-15 g/hL (rosé wines) and 5-20 g/hL (red wines)

SKU: 1 KG

MANNOPROTEINS

INTRODUCTION

Mannoproteins are yeast cell wall components that are proteins with large numbers of mannose groups (sugar units) attached. They are extracted from the cell walls of the yeast *Saccharomyces cerevisiae*. The yeast secretes these mannoproteins during alcoholic fermentations and during yeast autolysis.



Mannoprotein fractions can vary in their behaviour, application and effect based on:

- the length of the mannan chains;
- the size of the peptide fraction;
- the relative proportions of the peptide and mannan fractions;
- the specific yeast strain;
- different conditions of extraction/autolysis and;
- different methods of micro/ultra-filtrations to separate the mannoprotein.

Due to the different mannoprotein fractions, their effect in wine differs. In the case of commercial mannoproteins, the fractions are usually used to prevent tartrate crystallization and/or enhance the sensory profile of the wine. The first mentioned works via the inhibition of the tartrate crystal nucleus, whilst the latter is due to the stabilisation of the aroma compounds due to the protein fraction of the mannoprotein.

MANNOPROTEIN SELECTION

	Claristar	Final touch Pop	Final touch Tonic	Final touch Gusto
White wine	■		■	
Rosé wine	■		■	
Red wine	■			■
Sparkling and MCC wines		■		
Tartrate stabilisation	■			
Enhanced mouthfeel	■	■	■	■
Stabilise aroma			■	
Enhanced aroma				■
Enhanced fineness and freshness				■
Reduced astringency				■
Enhanced bubble finesse		■		

PRODUCT CATALOGUE

CLARISTAR

Claristar inhibits the nucleation and growth of potassium tartrate crystals, enabling lasting stabilisation in white, rosé and red wines. Claristar also contributes to the sensorial quality of the wine.

TARTRATE SATBILISATION AND IMPROVEMENT OF WINE QUALITY

APPLICATION:

- Tartrate stabilisation.
- Preservation of natural acidity.
- Increased aroma expression.
- Sensation of volume and roundness on the palate.
- Improved aromatic freshness during wine storage.

USAGE: Claristar is easy to homogenise and can be added directly to the wine. Addition to be done as close as possible to final filtration and bottling. Protein stabilisation and final blending must be completed before the addition of Claristar. The final stages of filtration and bottling can be carried out immediately after the addition of Claristar. It is recommended to use Claristar after filters using diatomaceous earth filtration. Claristar can be filtered through membranes, filtering plates, tangential filters and lenticular models. An optimum filtration requires a porosity equal or lower than 1.2 µm.

DOSAGE: 50-120 ml/hL (subject to analysis: contact your technical sales manager directly)

SKU: 2.5 L

FINAL TOUCH POP

This is a unique mannoprotein-based solution that enhances the organoleptic qualities of sparkling wines, while also preserving their elegance, freshness and balance. The fermentation aromas and minerality of wines treated with Final touch POP remain predominant during ageing and storage. The development of oxidative aromas (hints of ripe fruit, nuts and honey) is attenuated and tannins are less astringent.

IMPROVE THE QUALITY OF SPARKLING WINES

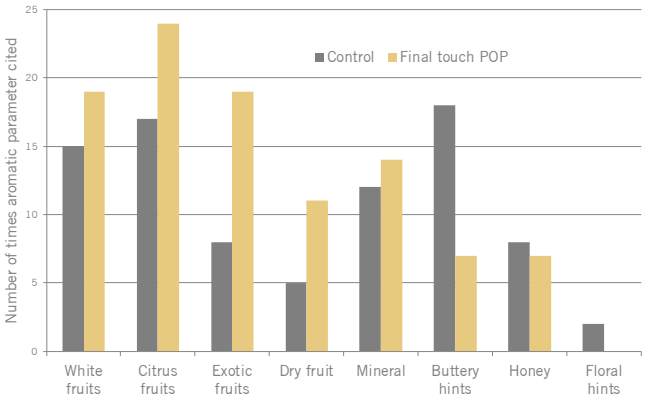
APPLICATION:

- Improves the wine's structure and bubble quality.
- Provides a refined aromatic profile and persistence.
- Aids in elegance, freshness and balance.
- Provides smooth and round mouthfeel.
- Limits oxidation to increase longevity.
- Reduces astringency of rosé and tannic sparkling wines.
- Can also refresh base wines.
- To be added directly to the liqueur at disgorgement or before bottling for Charmat methods.

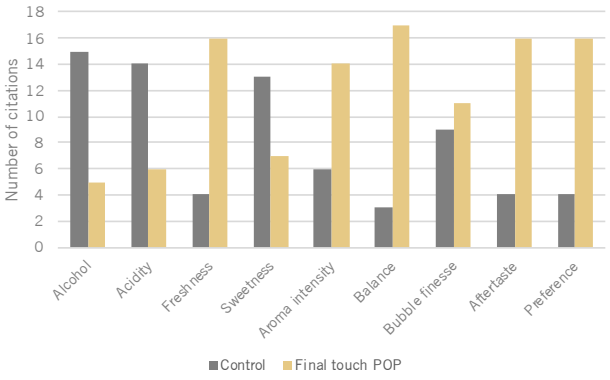
USAGE: Final touch POP is completely soluble and can be added directly to the wine. Add homogenously to sparkling wines after the second fermentation, immediately before bottling (Charmat method), or to the dosage or liqueur added after disgorging (traditional method).

DOSAGE: 20-40 ml/hL

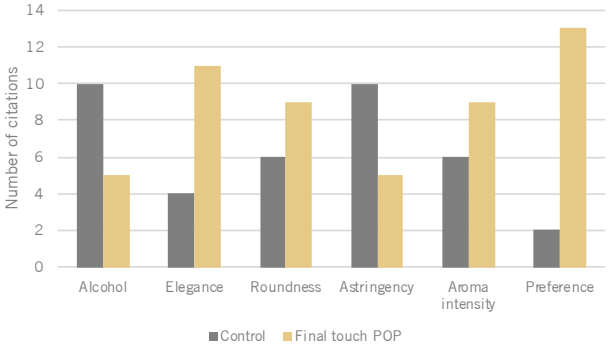
SKU: 1 L

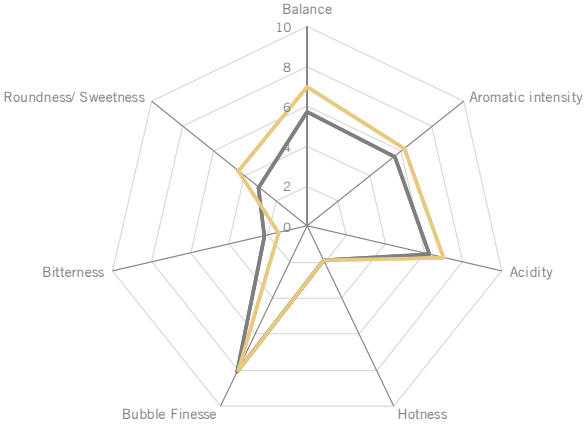


Comparison of Asti Dolce
Dose : 30 ml/hl
Tasting after 8 months



Comparison of Spumante
Dose : 30 ml/hl
Tasting after 6 months





FINAL TOUCH TONIC

This specially selected mannoprotein-based solution contains mannoproteins selected for their powerful reducing and protective colloid properties. Final touch Tonic preserves the initial aromatic freshness of white and rosé wines as they age.

ENHANCES THE ORGANOLEPTIC QUALITIES OF WHITE AND ROSÉ WINES, WHILST PREVENTING PREMATURE AGEING OF THEIR AROMAS

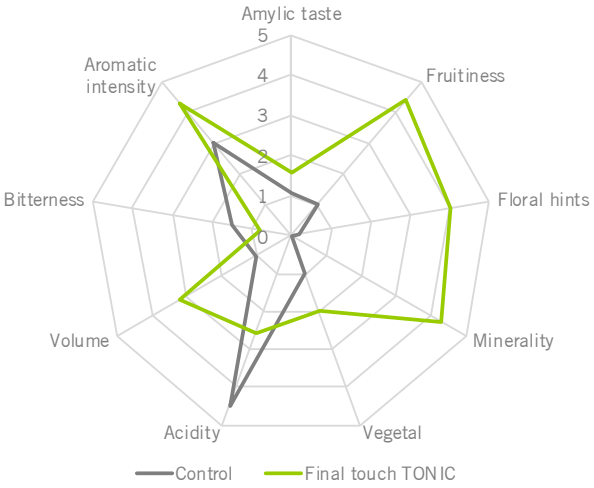
APPLICATION:

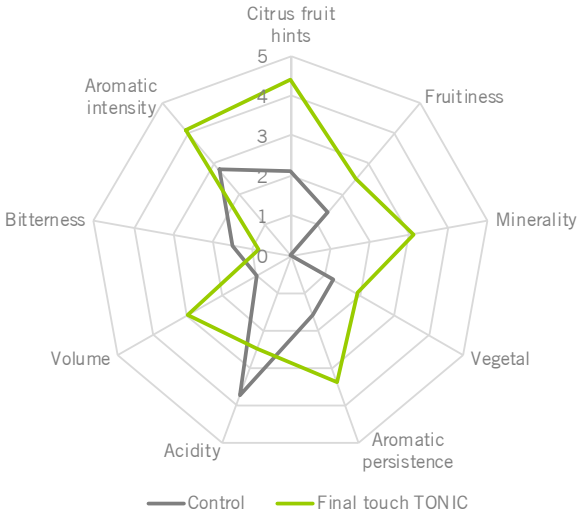
- Improves & preserves the freshness.
- Protects from oxidation over time.
- Promotes aromatic expression and persistence.
- Contributes to the wine's colloidal balance helping to improve its structure.
- Adds to the continuity of the wine, a lower perception of acidity and more balance overall.

USAGE: Final touch Tonic is completely soluble and can be added directly to the wine. Add homogenously to white and rosé wines just before bottling.

DOSAGE: 20-40 ml/hL

SKU: 1 L





FINAL TOUCH GUSTO

When used in red wines, this mannoprotein noticeably enhances the aroma intensity, fineness and freshness, as well as reducing the astringency of tannins.

ENHANCING THE ORGANOLEPTIC AND SENSORY PROPERTIES OF RED WINES

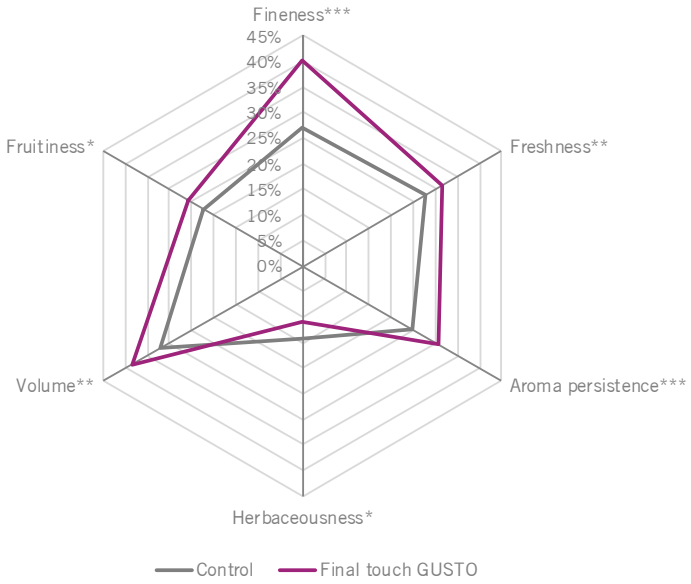
APPLICATION:

- Improves the aromatic intensity.
- Promotes freshness and fruitiness.
- Reduces astringency, more significantly at lower dosages.
- Contributes to a rounder wine structure.

USAGE: Final touch Gusto is completely soluble and can be added directly to the wine. Add homogenously to red wines just before final filtration and bottling.

DOSAGE: 10-40 ml/hL

SKU: 1 L

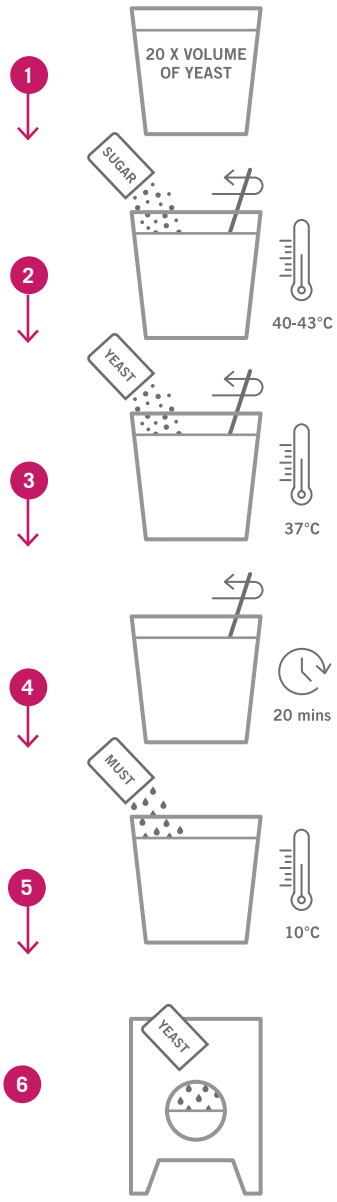


Sensory profile – compiled results of 8 wines (25 people).
Control vs. Final touch GUSTO
*** significant at 1% level, ** 5% level and * 10%

CHAPTER 8:
PROTOCOLS

OPTIMAL YEAST REHYDRATION PROTOCOL

Yeast rehydration is one of the most important steps in winemaking. In ensures a string and healthy fermentation. The recommended inoculation dosage for active dried wine yeast is 20-30 g/hL to ensure a viable yeast population of approximately 3-4 x 10^6 viable yeast cells per millilitre of must. After inoculation there is a slight increase in yeast biomass after which the fermentation starts. Increased inoculation rates are required for more challenging fermentation conditions.



The rehydration mixture should be 20 times the volume of the yeast (1 kg of yeast in 20 L of rehydration mixture).

Mix 50 g/L of sugar in hot water at 40-43°C and dissolve 20 g/hL Anchorferm in the medium.
Stir to disperse.

Once the medium reaches 37°C, add 20-30 g/hL active dried wine yeast while actively stirring to break up any lumps.

Let the suspension stand for 20 minutes.
Stir gently after 20 minutes.

Slowly add equal amount of the must to be fermented, to the yeast suspension. Avoid cold shocks of more than 10°C. Repeat the temperature adjustment step until the yeast suspension is within 10°C of the must to be inoculated.

Add the yeast suspension to the bottom of the fermentation vessel as you start filling or inoculate directly, ensuring you mix the yeast suspension throughout the must.

ROSÉ WINE IN THE **AMYLIC STYLE** VIA DIRECT PRESSING

TASTING NOTES: Candy, sweet, confectionery and bonbon.
All red varieties, except Pinotage.

1

CRUSH

Add **RAPIDASE® EXTRA PRESS** as early as possible on grapes at 2 - 3 ml/100 kg to increase juice yields and allow for softer and shorter pressing cycles.

2

DIRECT PRESSING

3

COOLING

Add **RAPIDASE® FLOTATION** as early as possible after pressing at 1 - 3 ml/hL to reduce flotation time and increase migration of solid particles

4

CLARIFICATION
(settling or flotation)

50-80 NTU
Add **RAPIDASE® CLEAR** for settling, more compact lees and clearer must.
> 13°C: 1 - 2 ml/hL
10 - 12°C: 2 - 3 ml/hL
< 6 hours of settling: 3 - 4 ml/hL

Rehydrate yeast in **ANCHORFERM** at 20 g/hL to increase yeast viability during fermentation and stimulate growth and metabolism.

Inoculate for AF with **ANCHOR VIN 13** at 20 g/hL.

5

ALCOHOLIC FERMENTATION

13 -16°C
Add **ANCHOR NUTRIVIN** (complex yeast nutrient) 2 - 3 days after the start of the AF at 20 g/hL and future dosages as needed.

6

DOWNSTREAM PROCESSING

Add **FINAL TOUCH® TONIC** at 20 - 40 ml/hL to produce fruitier, fresher, more aromatic wines and reduce bitterness.

Add **CLARISTAR®** at the recommended dosage based on the analysis performed by Anchor Oenology to ensure tartrate stability in all Rosé wines.

7

BOTTLING

ROSÉ WINE IN THE **THIOL STYLE** VIA MACERATION

TASTING NOTES: Tropical fruit and citrus aroma good mouthfeel, white flesh fruit aromas like peach.
Cabernet Sauvignon, Merlot and Shiraz.

1

CRUSH

2

COOLING

3

SHORT MACERATION

Add **RAPIDASE® EXPRESSION AROMA** as early as possible during maceration at 2 - 4 g/100 kg for the enhanced extraction of aroma precursors.

4

PRESS

Add **RAPIDASE® FLOTATION** as early as possible after pressing at 1 - 3 ml/hL to reduce flotation time and increase migration of solid particles.

5

CLARIFICATION
(Settling or flotation)

30-60 NTU
Add **RAPIDASE® CLEAR** for settling, more compact lees and clearer must.
> 13°C: 1 - 2 ml/hL
10 - 12°C: 2 - 3 ml/hL
< 6 hours of settling: 3 - 4 ml/hL

Rehydrate yeast in **NATUFERM® BRIGHT** at 20 - 30 g/hL, for a unique formulation rich in available amino nitrogen to promote a healthy yeast population and the production of aromatic compounds by the yeast. Add a second dosage before 1/3 of fermentation.

6

ALCOHOLIC FERMENTATION

14 -19°C
Add **ANCHOR NUTRIVIN SUPER** (thiamine enriched complex yeast nutrient) 2 - 3 days after the start of the AF at 20 g/hL and future dosages as needed.

Inoculate for AF with **FERMIVIN® 4F9** at 30 g/hL. For the fermentation of cold musts. Produces wines that have a long finish, with grapefruit, stone fruits and tropical fruit flavours.
OR
Inoculate for AF with **ANCHOR EXOTICS NOVELLO** at 30 g/hL. Produces wines that are fresh and fruity with aromas of grapefruit, guava and granadella.

7

DOWNSTREAM PROCESSING

Add **FINAL TOUCH® TONIC** at 20 - 40 ml/hL to produce more aromatic intensity, citrus fruit, freshness and minerality.

Add **CLARISTAR®** at the recommended dosage based on the analysis performed by Anchor Oenology to ensure tartrate stability in all Rosé wines.

8

BOTTLING

ROSÉ WINE IN THE **ESTER STYLE** VIA MACERATION

TASTING NOTES: Raspberry, strawberry, cherry and fruity esters.
All red varieties, especially Pinotage.

1

CRUSH

2

COOLING

3

SHORT MACERATION

Add **RAPIDASE® EXPRESSION AROMA** as early as possible during maceration at 2 - 4 g/100 kg for the enhanced extraction of aroma precursors.

4

PRESS

5

CLARIFICATION
(settling of flotation)

Add **RAPIDASE® FLOTATION** as early as possible after pressing at 1 - 3 ml/hL to reduce flotation time and increase migration of solid particles.

30-60 NTU
Add **RAPIDASE® CLEAR** for settling, more compact lees and clearer must.
> 13°C: 1 - 2 ml/hL
10 - 12°C: 2 - 3 ml/hL
Lower NTU's promote fruity ester production.

6

ALCOHOLIC FERMENTATION

Rehydrate yeast in **NATUFERM® BRIGHT** at 20 - 30 g/hL, for a unique formulation rich in available amino nitrogen to promote a healthy yeast population and the production of aromatic compounds by the yeast. Add a second dosage before 1/3 of fermentation.

Inoculate for AF with **ANCHOR VIN 13** at 20 g/hL.

12 -16 °C
Add **ANCHOR NUTRIVIN** (complex yeast nutrient) 2 - 3 days after the start of the AF at 20 g/hL and future dosages as needed.

7

DOWNSTREAM PROCESSING

Add **FINAL TOUCH® TONIC** at 20 - 40 ml/hL to preserve the longevity of the aroma compounds and enhance the mouthfeel properties.

8

BOTTLING

Add **CLARISTAR®** at the recommended dosage based on the analysis performed by Anchor Oenology to ensure tartrate stability in all Rosé wines.

ROSÉ WINE IN THE **RED BERRY STYLE** VIA SAIGNÉE (BLEEDING)

TASTING NOTES: Red fruit, cherry, raspberry, redcurrent, pomegranate, smooth, some black fruits, roundness.
All red varieties, except Pinotage.

1 
CRUSH

2 
COOLING

3 
RED WINE


SHORT MACERATION

Add **RAPIDASE® EXTRA COLOR** as early as possible during maceration at 2 - 4 g/100 kg for targeted extraction of colour and polyphenols.

4 
PRESS

Add **RAPIDASE® FLOTATION** as early as possible after pressing at 1 - 3 ml/hL to reduce flotation time and increase migration of solid particles.

5 
CLARIFICATION
(Settling of floatation)

80 -150 NTU
Add **RAPIDASE® CLEAR** for settling, more compact lees and clearer must.
> 13°C: 1 - 2 ml/hL
10 - 12°C: 2 - 3 ml/hL

Add **NATUFERM® PURE** at 20 - 30 g/hL, for a unique formulation rich in available amino nitrogen to promote a healthy yeast population and the yeast production of aromatic esters.
AND
Add **ANCHOR NUTRIVIN** (complex yeast nutrient) 2 - 3 days after the start of the AF at 20 g/hL and future dosages as needed.

6 
ALCOHOLIC FERMENTATION

18 - 22°C
Inoculate with **ANCHOR NT 116** (20 g/hL) if Scott'Tan FT Rouge Berry will be used.
Add **SCOTT'TAN FT ROUGE BERRY** (2 - 15 g/hL) 24 - 48 hours after inoculation.
OR
Inoculate for AF with **FERMIVIN® XL** at 30 g/hL for softer, fruity and smooth wines with red and black fruits and round mouthfeel.
OR
Inoculate for AF with **ANCHOR ALCHEMY IV** at 30 g/hL for intense red fruit production.

7 
DOWNSTREAM PROCESSING

Add **FINAL TOUCH® TONIC** at 20 - 40 ml/hL to preserve the longevity of the aroma compounds and enhance the mouthfeel properties.

Add **CLARISTAR®** at the recommended dosage based on the analysis performed by Anchor Oenology to ensure tartrate stability in all Rosé wines.

8 
BOTTLING

RED WINE STYLE PROTOCOL

	PREMIUM		ULTRA-PREMIUM		ICONIC
WINE STYLE	**FRUITY**	**STRUCTURED**	**INTENSE FRUIT**	**COMPLEX**	**AGED WINES**
ENZYMES	**RAPIDASE FAST COLOR** For fast colour and polyphenol extraction in short maceration periods		**RAPIDASE EXTRA COLOR** For better colour and polyphenol extraction		**RAPIDASE EXTRA FRUIT** For extraction of aroma precursors
FERMENTATION TANNINS	**FT ROUGE BERRY** Red berry characters and mid-palate volume	**FT ROUGE** Stabilise colour and increase structure	**FT ROUGE BERRY** Red berry characters and mid-palate volume	**FT ROUGE** Stabilise colour and increase structure	**FT ROUGE SOFT** Stabilise colour and increase structure
FERMENTATION	**NT 50** Fruity and rounded wines	**NT 202** Intense, structured and complex wines	**ALCHEMY IV** Rounded, soft wines with intense red fruit characters	**ALCHEMY III** Complex wines with stable esters and less green characters	**EXOTICS MOSAIC** Complex wines with intense mouthfeel
REHYDRATION	**ANCHORFERM** For better yeast viability and fermentation capabilities				
MALOLACTIC FERMENTATION	**DUET AROM** Fruity and spicy	**DUET SOFT** Mouthfeel and softness	**DUET AROM** Fruity and spicy	**DUET SOFT** Mouthfeel and softness	**DUET SOFT** Mouthfeel and softness
NUTRITION	**NUTRIVIN** Stimulate yeast growth and metabolism		**NATUFERM BRIGHT** Enhance the aroma production capabilities of the yeast		**NATUFERM PURE** Enhanced ester production
AGEING AND FINISHING TANNINS	**RICHE** French oak for complexity		**RICHE EXTRA** American oak for complexity		**ESTATE** Better mid-palate and complexity, as well as fruit character
MANNOPROTEINS	**FINAL TOUCH GUSTO** Stabilise aroma intensity and softens tannin perception				

RESTART STUCK FERMENTATION PROTOCOL

The probability of a stuck fermentation increases due to:

- Low turbidity
- High sugar concentrations
- Low assimilable nitrogen
- Late anti-*Botrytis* treatments
- Difficult to ferment cultivars

1. Add 40-60 g/hL of Extraferm 24-48 hours prior to restart.

2. After 24-48 hours, rack the wine off the Extraferm lees.

3. Add a complex yeast nutrient to the stuck wine:

STUCK WINE SUGAR CONCENTRATION:	DOSAGE OF COMPLEX YEAST NUTRIENT TO ADD:
>3°B	6-12 g/hL
1-2°B	6 g/hL
<1°B	no nutrient addition required

Add Delvozyme at 100 mg/L to reduce the bacteria population.

4. Create a mother tank containing 1% of the stuck wine volume and an equal amount of chlorine-free water.

5. In a separate vessel:
   a. Dissolve Anchorferm at 20 g/hL in 20 times its weight in chlorine-free hot water (43°C). Stir to disperse and let the mixture cool to 37°C.
   b. Select a vigorous, alcohol tolerant strain like Fermivin Champion or Anchor VIN 13. Slowly add the yeast (30-60 g/hL) to the rehydration mixture. Stir gently. Let the suspension stand for 20 minutes.
   c. Allow the yeast suspension to cool down to within 10°C of the wine/water mixture in the mother tank.

6. Add the yeast suspension to the mother tank. Wait 20-30 minutes.

7. Add 10% of the stuck wine to the mother tank. Wait 20-30 minutes.

8. Add 20% of the stuck wine to the mother tank. Wait 20-30 minutes.

9. Repeat step 8. Then add the remaining stuck wine to the mother tank.

HOW TO REDUCE SMOKE TAINT IN CONTAMINATED WINE

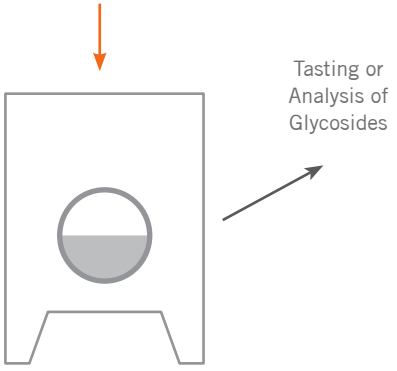
Volatile phenols (guaiacol and 4-methylguaiacol) exist as odorless glycosylated precursors that are hydrolyzed slowly into volatile taints.

What we recommend :

- to do short macerations to avoid the extraction of the off-flavor compounds, mainly located in the skin (free and bound guaiacol and 4-methylguaiacol).
- to eliminate the bound AND the free forms in order to solve the immediate problem and to prevent the delayed occurrence of smoke taint.

1. CONVERT ALL BOUND FORMS OF "SMOKY" MOLECULES INTO FREE FORMS

RAPIDASE HIGH SPEED ENZYMES SINCE 1922 REVELATION AROMA

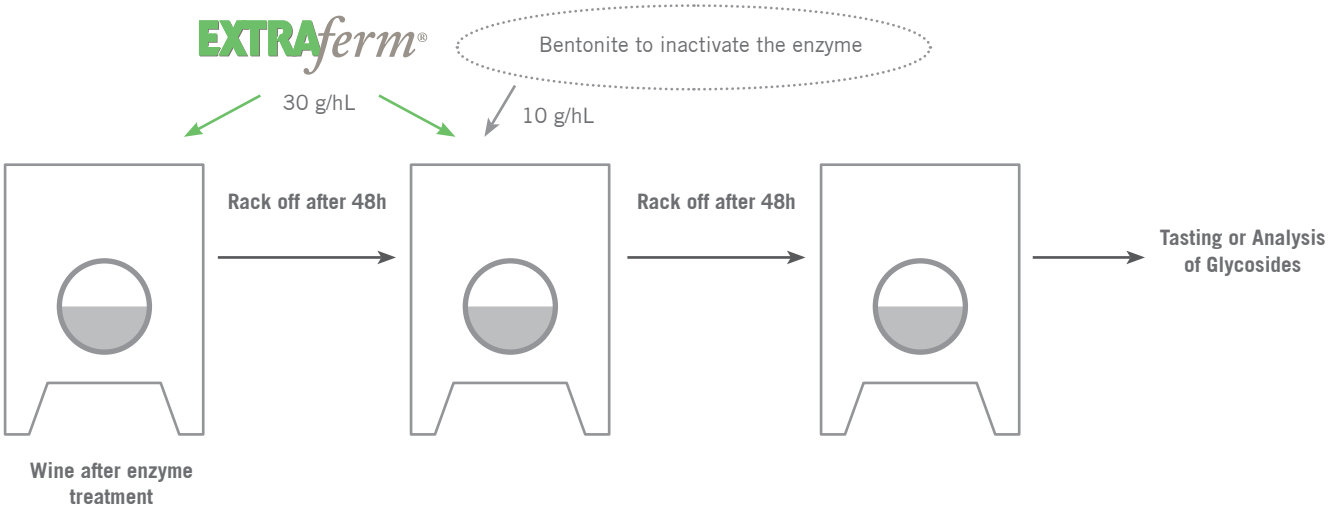


- Temp. >16°C: 2-3 g/hl
- Temp. 12-16°C: 3-4 g/hl

Min. 2 weeks incubation to complete enzyme hydrolysis of glycosylated precursors

Rapidase Revelation Aroma is a microgranulated pectolytic enzyme preparation with the four essential glycosidases activities.

2. REMOVE THE FREE FORMS OF 'SMOKY' MOLECULES FROM THE WINE



EXTRAferm® Feel SAFE!

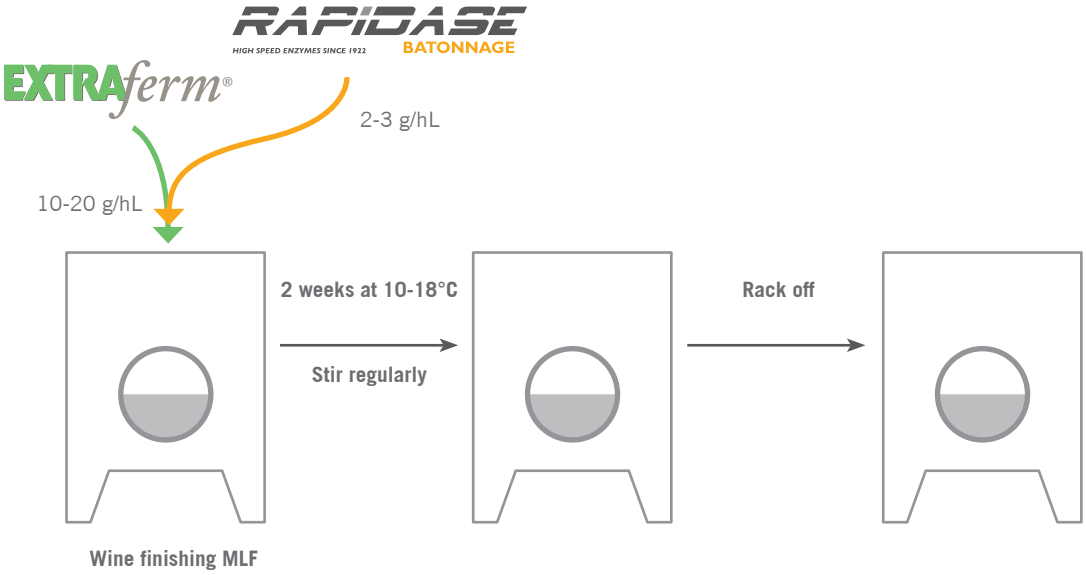
2 x 30 g/hl

Treat the wine with Extraferm in two successive additions at 48h intervals. Homogenize/stir, settle and rack off between the two additions.

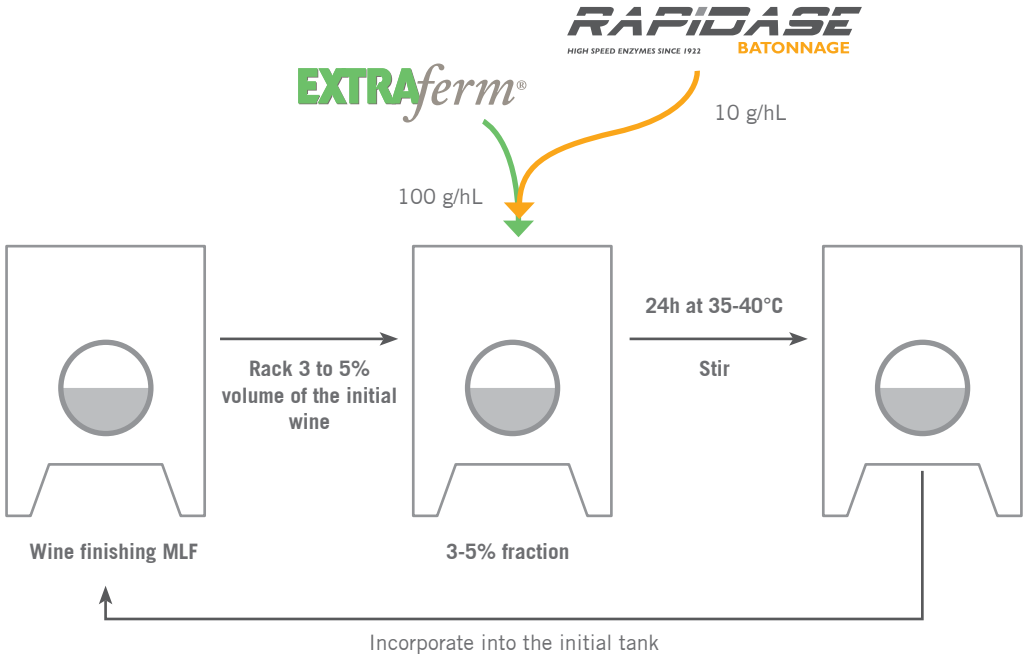
Extraferm is a unique & highly adsorbent cell wall for detoxification, which adsorbs and eliminates many toxic and undesirable compounds present in must and/or wine.

HOW TO SPEED UP AGEING ON LEES

Using a combination of Extraferm and Rapidase Batonnage reproduces the naturally occurring autolytic reaction under controlled conditions. This will speed up the release of components such as polysaccharides, amino acids, nucleic acids and mannoproteins, having a sensorial impact improving the mouthfeel, balance and reducing bitter notes.



OPTION: TO WORK ON A FRACTION OF THE WINE



EXTRAferm®

Extraferm is a unique & highly adsorbent cell wall for detoxification, which adsorbs and eliminates many toxic and undesirable compounds present in must and/or wine.

RAPIDASE HIGH SPEED ENZYMES SINCE 1922 BATONNAGE

Rapidase Batonnage is microgranulated pectolytic and β-glucanase enzyme preparation enhancing the release of mannoproteins and other beneficial colloids contained in dead yeast cells naturally present in wine lees. Its use allows obtaining wines with increased mouthfeel and balance.

NOTES

NOTES

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