



Pinnacle™ Wine Ingredients Catalogue



Issue 4 • 2025

Pinnacle™



 **AB Biotek**

PARTNERS IN FERMENTATION™

A business division of AB MAURI

www.abbiotek.com
pinnaclewineingredients.com

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Who we are

AB Biotek is a business of AB Mauri, the global yeast and bakery ingredients division of the international group Associated British Foods (ABF).

The ingredients businesses of ABF are comprised of our two specialty ingredients businesses, AB Mauri and ABF Ingredients.

AB Mauri has a global presence in yeast with significant market positions in the Americas, Europe, and Asia. **We are a technology leader in yeast and ingredients**, supplying bread improvers, dough conditioners and bakery mixes to industrial and craft bakers across the globe.

ABF Ingredients is a **global leader in specialty ingredients**, offering innovative, differentiated and value-added products to the food, nutrition, pharmaceutical, animal feed and industrial sectors. Our ingredients are an essential part of products that are equally likely to be found in the kitchen and medicine cabinet as in production units and research laboratories.

For further information on ABF please visit www.ABF.co.uk

... as part of the ABF group we have direct access to the wider technology portfolios of our sister companies in the ABF Ingredients family and their technology portfolios



A business division of AB MAURI

**Associated
British Foods
plc**

AB|MAURI



AB Biotek's business within AB Mauri is one focused on solutions for the alcohol beverage, bioethanol and animal nutrition sectors.

Our alcohol beverage solutions business has been developed over many years and we are a **leading global producer**, specialising in **serving the wine, distilled spirits and brewing sectors**, where we are a supplier and developer of **value-add yeast and associated fermentation products**.



Our heritage in the wine industry began as a result of our global capability in fermentation know-how, yeast science & technology and production expertise. **We have pioneered wine yeast product development and have created a successful international business supplying some of the world's leading winemakers.** AB Biotek provides winemakers with an **extensive portfolio of wine ingredient solutions and applications expertise**. Our historical global leadership in yeast and fermentation science has expanded to include a wide range of oenological technologies such as **enzymes, yeast, fermentation aids, polysaccharides, tannins and bacteria**. Our scientists, in partnership with our own wine experts and external partners, **constantly strive to develop**



What we do

AB Biotek invests heavily in research and development, working with research institutes and universities around the world. This ongoing investment ensures we continue to deliver new and innovative products to our customers across our platforms of wine ingredients.

AB Biotek's Global Technology Centre (Sydney, Australia) is our own specialist hub for wine yeast and fermentation know-how. Our talented team of microbiologists, fermentation scientists, researchers, analytical specialists and oenologists provide valuable service to AB Biotek operations, the net result being the ongoing development of superior multi-technology solutions for the wine industry. As part of our expanding investment in wine ingredient technologies, our new applications centres in St Louis (USA) and Etten-Leur (Netherlands) have extended our capability in supporting winemakers with innovative products to address some of the key challenges facing our customers today.



Product Development & Innovation

AB Biotek R&D teams understand the necessity to deliver to the wine industry cutting-edge solutions via new, improved products that can make a difference.

Our historical success as a yeast producer has been built on a mindset of continuous improvement in what we do and how we do it, with a **strong focus on delivering consistently meaningful and empowering solutions to our customers**. This philosophy extends to our wider portfolio. Ultimately, **we aim to be the preferred supplier of wine ingredients for our customers**.

Technology Partnerships

As a global leader in the production of wine yeast technologies and their application, we believe that AB Biotek can be a strong partner to the independent biotech community, biotech industry operators and national/international institutes working in the wine sector.

We continue to work on developing new products via our own R&D teams but recognise that the pace and breadth of consumer demand requires product development in a wider research and development community and at a faster pace than ever before. At AB Biotek **we actively encourage technology partnering for wine customer solutions** and work on a global basis with renowned institutes and universities.

Technical Research

Our wine technologists undertake ongoing applied research on our products (current and new) to gain further insights on how our ingredients influence fermentation in the surrounding grape juice environment and post-fermentation how they can help deliver organoleptic and colour improvement.

In yeast, for example, this research includes the discovery of which strains utilise assimilable nitrogen more rapidly during fermentation, the ethanol production from each of our strains and which strains are more efficient at converting malic acid toward the end of fermentation (hence lowering malolactic bacteria fermentation times), if required at all.



Our Portfolio

Each of our wine ingredient product ranges is introduced in this catalogue. Further detail and specific product information sheets can be found online at:

pinnaclewineingredients.com



... Our ingredients are developed and tested with renowned research institutes and validated by some of the best wineries from around the globe.



AB Biotek Quality Commitment

All Pinnacle™ wine ingredients supplied by AB Biotek are produced to specifications to ensure the highest standards in terms of:

- ✓ quality
- ✓ reproducibility
- ✓ reliability
- ✓ traceability

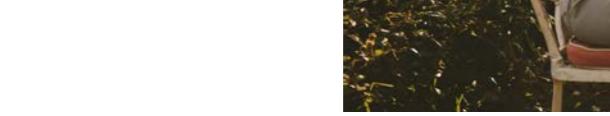


Pinnacle™ wine yeast and associated wine ingredient products have been specifically developed to provide multiple technology and process solutions to wine producers operating in a market where the traditions of craftsmanship and heritage now meet the future challenges of changing consumer tastes, climate volatility and viticultural practices.

The focus of the Pinnacle™ range is to offer winemakers a premium standard of fermentation performance to produce the wines their customers love, more consistently than before, in this new age.

The experience and knowledge which has created the Pinnacle™ range has been gathered over 150 years of operations in fermentation and multiple ingredients technologies worldwide, with support from world-renowned wine research institutions.

More at pinnaclewineingredients.com



Wine Yeast and Ingredients

Consumers are constantly looking for new experiences and this trend in wine is increasing demand for bold and improved flavours and aroma complexity – but without negative characteristics.

The Pinnacle™ range is an innovative and enabling source of complete solutions tailored for today's taste trends and the increasing impacts on winemaking through climate change, changing viticultural practices, adoption of new grape varieties and changes in winery technology and throughput requirements.



The Pinnacle™ range is an innovative and enabling source of **complete solutions** tailored for today's taste trends



Wine Yeast

For premium winemakers to produce their styles of wine, they need a yeast portfolio that has been **researched and selected to deliver the technical depth to produce aromas and flavours** consistent with the terroir, the **capability to deliver premium wine styles**, and the **resilience** to withstand the greater stress tolerance encountered in today's winemaking environment.

Wine Ingredients

Winemakers are looking for **consistency of performance in fermentation and post-fermentation phases** including process efficiency, colour development and organoleptic delivery to meet the new trends in wine for improved flavour and aroma.

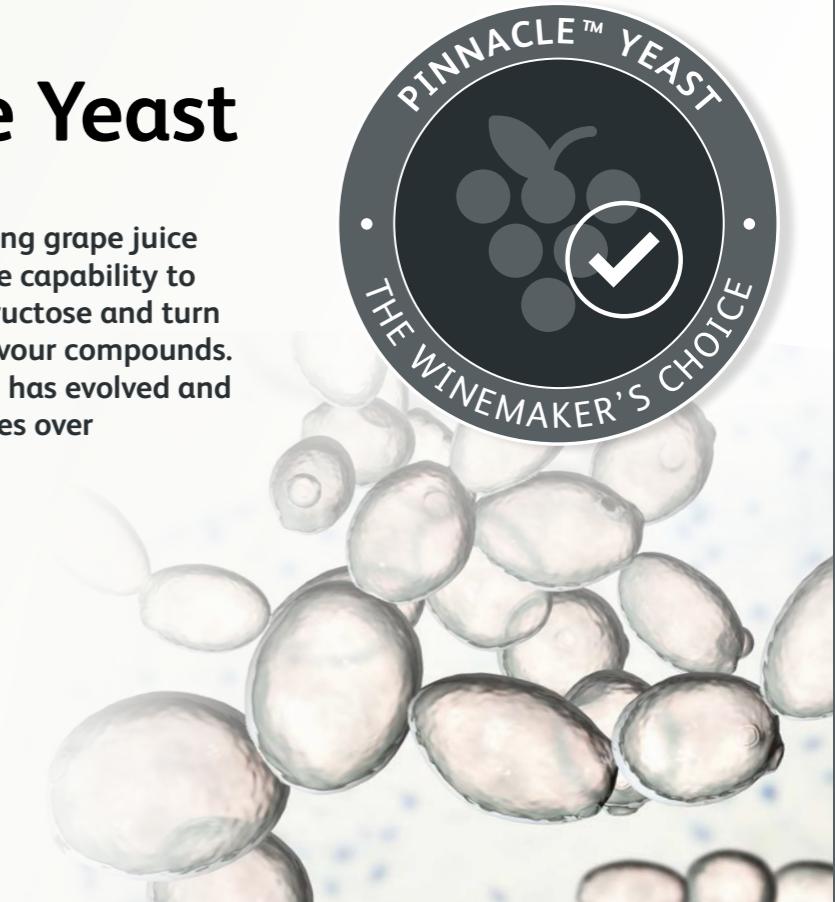
The Pinnacle™ wine ingredients range of enzymes, yeast, fermentation aids, polysaccharides, tannins and bacteria has been **created to enhance, correct, and improve fermentation and post-fermentation activity** so that the resulting desired wine styles are of **premium quality** for consumers to enjoy and value. AB Biotech has specifically developed the Pinnacle™ wine ingredients range to be the **winemaker's choice** for complete formulations for premium wines with minimal fuss and ease of use in the winery.

Pinnacle™ Wine Yeast

Yeast is the critical instrument in converting grape juice into wine. These unicellular fungi have the capability to utilise grape sugars mainly glucose and fructose and turn them into alcohol, carbon dioxide and flavour compounds. Yeast has incredible survival instincts and has evolved and adapted to changing winemaking practices over many centuries.

As a result, there is a large and diverse range of wine yeast strains from across the world that have specific and favourable attributes for making the desired wine style.

In addition, the changing trends to bolder fruit flavours, higher alcohol wines and the ever-present threat of climate change have led to the need for more **robust and stress-tolerant wine yeast strains**. With this in mind, AB Biotech has spent years isolating, screening, developing and manufacturing a **wine yeast strain portfolio** that meets the current winemaking trends of the 21st century.



Years of research, development and fine-tuning have given rise to a suite of yeast growth and drying profiles which form the AB Biotech platform for dry wine yeast production. These reference processes are further adapted by strain to optimise specific product performance for winemakers.



Yeast Growth Process

The aim of the growth process is to ensure yeast cells in the final dry product are:

- ✓ **nutritionally sound** and well supplied with essential nutrients that may be limited in grape juice
- ✓ **robust** to withstand the drying process to perform optimally in winemaking applications.

Nutrition is the foundation building block for a high performing dry yeast product. This ensures SO_2 resistance, stress tolerance and sufficient vitamins and minerals to prevent negative aromas developing during fermentation.

Next is the growth profile. **Each wine yeast strain is unique in its ability to grow on different sugar and nitrogen sources**, as well as its optimal vitamin and mineral requirements. Controlled parameters such as growth rate, pH, temperature and dissolved oxygen profiles all affect the fitness of the final yeast in the grape juice fermentation process.

Yeast is grown aerobically, i.e. in a high oxygen environment. This is important to winemaking in that it **prepares the yeast with essential cellular materials such as sterols and unsaturated fatty acids**. The AB Biotech growth process is designed to trigger and maximise the natural content of these key cell components.

Growth protocols are also designed to finish the yeast in a stage of the yeast cell cycle that allows maximum cell robustness, together with maximum trehalose content. All these properties are essential to preserve high cell viability and vitality during drying, and to maintain dry yeast stability in storage.

Drying

Production of dry wine yeast is essential to provide the convenience of a stable starting culture to winemakers globally in the quantities required locally. However, it is critical the drying process is designed to optimise yeast viability and vitality.

Viability is the ability of each yeast cell to replicate during winemaking, given that at least 4-5 v in cell number are required to ensure adequate wine fermentation kinetics and sugar exhaustion.

Vitality, on the other hand, means the metabolic capability (with minimum lag phase) to consume grape sugars and establish a fermentation rate typical of that yeast strain. The drying process needs to follow the water release phases inherent to yeast cells.

It is important to remember that yeast cells are adapted to drying out since they dry naturally in the environment. Time, drying temperature profile, inlet air humidity and airflow form a comprehensive design to allow passage of the yeast from approximately 30% solids when entering the dryer, to a final dry solids content of >93%. The high final solids guarantee dry yeast stability in storage.

An essential part of the AB Biotek process design is to dry slowly in the critical phases, but to also minimise overall drying time to prevent membrane lipid oxidation. Low and controlled inlet air humidity is vital to speed up the drying process and to ensure batch to batch repeatability.



Each dry yeast product is assessed through our dedicated applications centre to ensure it performs to our customers' expectations in the winemaking process. Once optimised, our production protocols are standardised to ensure winemakers experience consistency of product performance year after year.

Attributes of Pinnacle™ Wine Yeast

Strain	Wine Style	Alcohol Tolerance (v/v)	Lag Phase	Fermentation Speed	Nitrogen Requirements	Optimal Temperature	MLF Compatibility	Glycerol Production	VA Production
Bubbly	Sparkling/Restart	16%	Very short	Moderate	Low	10-32°C 50-90°F	N/A	Moderate	Low
Tropica	White	14.5%	Short	Fast	Moderate*	13-16°C 55-61°F	N/A	Moderate	Average*
White Select	White	15%	Medium	Moderate	Low to moderate	15-20°C 59-68°F	Recommended	High	Low
Cryo	White/Rosé	14%	Short	Fast	Low	12-24°C 54-75°F	N/A	Moderate	Very low
Fruit Red	Red/Rosé	15%	Short	Moderate	Low to moderate	18-29°C 65-84°F	Recommended	Low	Low
Complex	Red	15%	Long	Slow	Moderate	20-29°C 68-85°F	Highly recommended	Moderate	Low
Red	Red	16%	Very short	Moderate	Moderate to high	18-29°C 65-85°F	Recommended	High	Average
Red Select	Red	16%	Short	Moderate	Moderate to high	20-26°C 68-79°F	Not recommended	Moderate	Average
Fructo Select	Red/All	19%	Very short	Fast	Moderate	14-35°C 57-95°F	Recommended	Moderate	Low
Fructo	Red/Restart/All	18%	Very short	Fast	Low	13-35°C 55-95°F	Highly recommended	High	Average*
Robust	All	18%	Very short	Fast	Moderate	10-35°C 50-95°F	Inhibiting	High	Average
AWRI Bioprotect	All	6%	Very long	N/A	Low	28°C 82.4°F	N/A	Glycerol	Low

*Consult your AB Biotek technical representative regarding low-nutrient, highly clarified and high-sugar juices.

Attributes for leading global cultivars

Grape Variety	Bubbly	Cryo	Tropica	White Select	Complex	Fruit Red	Red	Red Select	Fructo	Fructo Select	Robust	AWRI Bioprotect
Airen	✓	✓		✓								✓
Albillo Mayor		✓		✓								✓
Alvarinho/ Godello	✓			✓								✓
Ancellotta						✓		✓	✓	✓	✓	✓
Aspirant Bouchet												✓
Bobal						✓	✓	✓	✓	✓		✓
Bonarda						✓		✓	✓	✓		✓
Cabernet Franc									✓			✓
Cabernet Sauvignon								✓	✓	✓		✓
Cariñena						✓	✓	✓	✓	✓		✓
Chardonnay	✓	✓				✓						✓
Chenin	✓	✓	✓			✓						✓
Criolla Grande		✓				✓						✓
Grenacha						✓	✓	✓	✓	✓		✓
Grenacha White	✓	✓				✓						✓
Malbec						✓	✓	✓	✓	✓		✓
Macabeo	✓	✓				✓						✓
Mazuelo						✓	✓	✓	✓	✓		✓
Merlot						✓	✓	✓	✓	✓		✓
Monatsrell						✓	✓	✓	✓	✓		✓
Moscatel			✓									✓
Muscat of Alexandria	✓	✓				✓						✓
Pedro Giminez			✓									✓
Pino Noir	✓						✓	✓				✓
Rioja Torrontes			✓									✓
Sauvignon Blanc/Verdejo		✓		✓								✓
Sangiovese							✓					✓
Syrah							✓	✓	✓	✓		✓
Tannat									✓	✓		✓
Tempranillo							✓	✓	✓	✓		✓
Tempranillo Blanco								✓				✓
Ugni Blanc												✓
Viognier							✓					✓
Viura	✓	✓				✓						✓
XarelLlo		✓				✓						✓

Many of our yeasts are suitable for both Direct pitch into juice/must or re-hydration before addition.. (please see product information sheet for clarification).

In the case of re-hydration, the protocol that is recommended for our yeast is as follows:

1. Measure water at 5-10 times the weight of the dry yeast.
2. Heat the water to 35-40°C (95-100°F). *Do not exceed 43°C (109°F).*
3. Sprinkle the yeast slowly and evenly into the water. *Never pour water over the yeast.*
4. Let the yeast sit for 15 minutes before stirring. *Do not leave it in water for more than 20 minutes to preserve cell activity.*
5. Cool the yeast solution slowly before adding it to must. *Make sure the temperature difference between the solution and must is no more than 10°C (50°F).*

Using Pinnacle™ Active Dry Wine Yeast



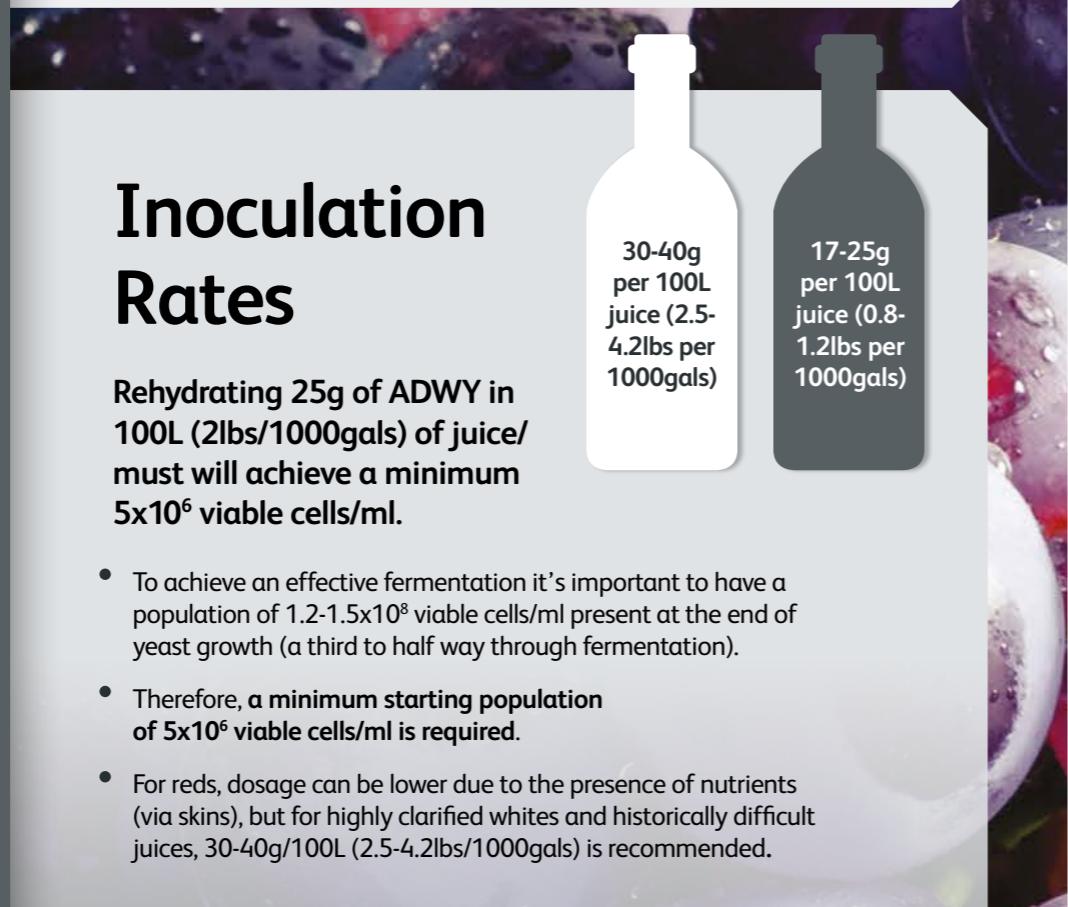
The proper preparation of Active Dry Wine Yeast (ADWY) is crucial for a successful fermentation.



A simple process, done properly, can save a lot of time and anxiety down the track.



Having an active starter culture minimises the lag phase (an important factor in achieving a healthy ferment) and decreases the chance of sluggish or stuck fermentations.



Inoculation Rates

Rehydrating 25g of ADWY in 100L (2lbs/1000gals) of juice/must will achieve a minimum 5×10^6 viable cells/ml.

- To achieve an effective fermentation it's important to have a population of $1.2-1.5 \times 10^8$ viable cells/ml present at the end of yeast growth (a third to half way through fermentation).
- Therefore, a minimum starting population of 5×10^6 viable cells/ml is required.
- For reds, dosage can be lower due to the presence of nutrients (via skins), but for highly clarified whites and historically difficult juices, 30-40g/100L (2.5-4.2lbs/1000gals) is recommended.

Recommended procedure for Rehydrating Pinnacle™ Active Dry Wine Yeast



This process takes about **30 MINUTES**

1

EACH STEP IS VITALLY IMPORTANT FOR OPTIMUM YEAST REHYDRATION

Rehydrate ADWY by slowly sprinkling it into 5-10 times its weight into clean water, pre-heated to between 35-40°C/95-104°F

- Any toxins or chemicals present in the water can harm/kill the yeast cells during rehydration.
- Rehydrating at a lower temperature will result in **essential cytoplasmic material leaking from the cells** (e.g. micronutrients), thus reducing cell viability.
- It's best when **first adding the yeast to water to mix very gently**, exposing all the yeast to the water.



3



Adjust the temperature of the rehydrated yeast solution to within 5°C/9°F of the juice/must (sulphite-free) to be inoculated by adding sufficient volumes to give successive 5°C/9°F reductions in temperature.

Acclimatise the yeast to the juice/must.

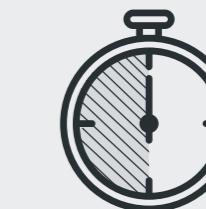
This should be done over a 15 minute period.

2

Allow the yeast to stand for **15 MINUTES** without stirring.

- Allows the cell membranes to regain maximum fluidity; without this step, if stirring too quickly it can physically damage the yeast cell membranes.

4



Use the yeast within **30 MINUTES** of rehydration.

- After 30 minutes, the activity of the yeast can **start to decline** due to lack of nutrients.
- This time can be extended if the yeast was acclimatised with juice or water containing nutrients.

5



It's recommended the juice/must to be inoculated is **18°C/64°F or higher** to avoid extended lag time.

- An important factor for the cell population to reach $1.2-1.5 \times 10^8$ viable cells/ml is for the temperature to remain **above 18°C/64°F for the initial stage of fermentation**.

- Within 10-20% of the sugar being metabolised (1-3 days), the **temperature of the ferment** can be reduced.

How we manufacture

Pinnacle™ Wine Yeast...

STEP 1

Preparation of Raw Materials

The Pure Yeast Culture

The production process begins with a pure wine yeast culture, grown on nutrient slopes under sterile conditions at AB Bioteck's Scientific & Technical Centre. This pure culture is then transferred to the quality control laboratory at an AB Bioteck wine yeast factory.

STEP 2

Production of Seed Yeast

The Inoculum

The pure culture is inoculated into the seed fermenter containing sterilised wort and other nutrients. The wort, a rich source of sugars essential for cell growth, is derived from clarified sugar cane molasses. Once the inoculum has grown to the desired cell number it is transferred to the main fermenter.

STEP 3

Fermentation

Once in the main fermenter the yeast is fed sterile molasses, nutrients and oxygen at a regulated rate to ensure optimum growth.

STEP 4

Separation & Washing

At the end of fermentation the yeast is harvested and washed using centrifugal separators, then chilled to <4°C. The yeast is now a light cream coloured suspension at ~20% solids referred to as cream yeast.

STEP 5

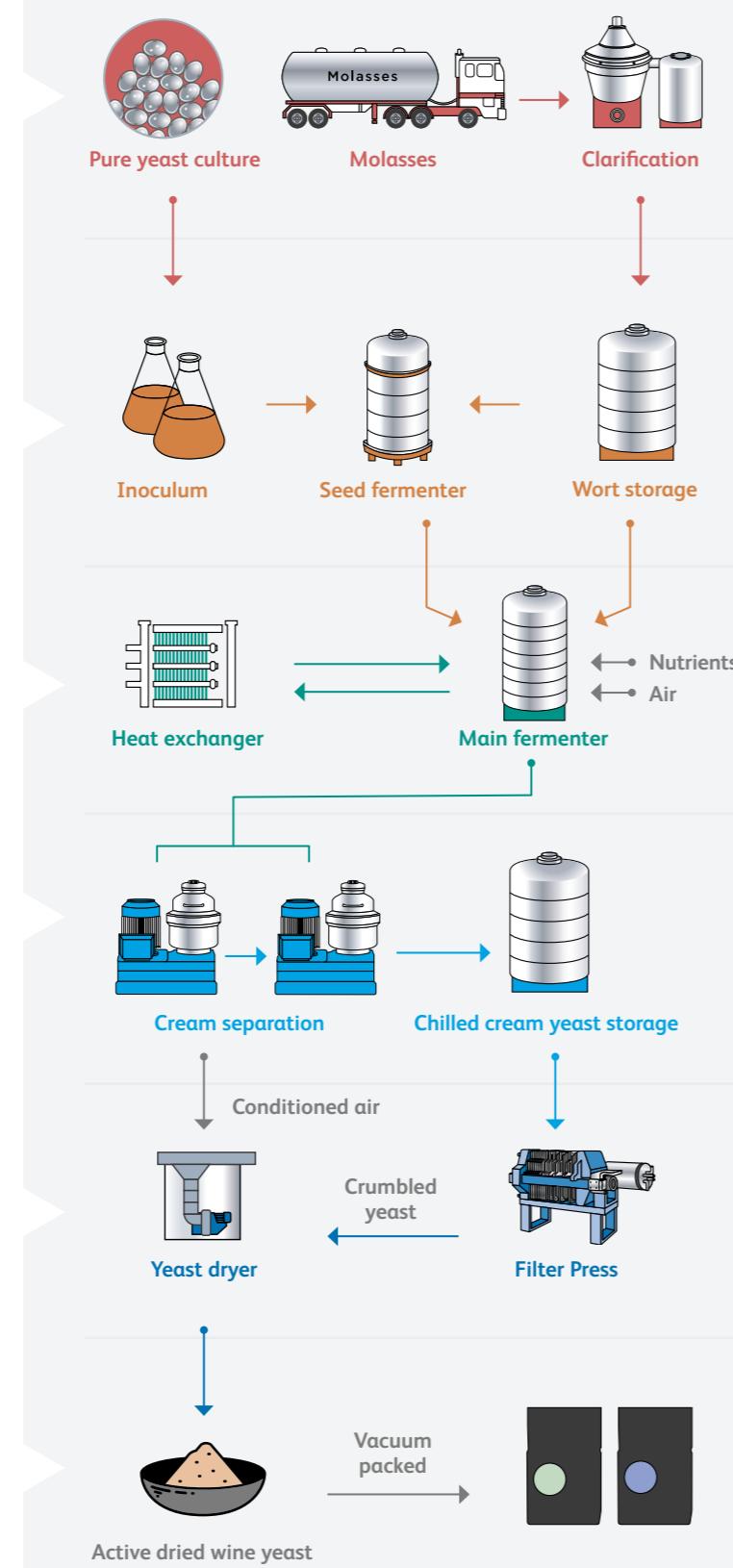
Dewatering & Drying

The cream yeast is first dewatered into a 'crumble' of about 30-34% solids using either a filter press or a rotary vacuum filter drum. The yeast crumble is then extruded and dried in a fluidised bed dryer using dehumidified air.

STEP 6

Packaging & Storage

Dry yeast >93% solids is cooled after drying then packed as quickly as possible into vacuum packs to minimise oxygen contact and moisture exposure. Vacuum packs guarantee oxygen and moisture impermeability throughout the shelf-life of the product.



Pinnacle™ Yeast product information

The tables that follow provide an overview of the Pinnacle™ wine yeast range. Detailed information sheets can be found online at pinnaclewineingredients.com

Characteristics	Applications	Advantages	Pack
Bubbly <small>suitable for DIRECT PITCH</small> <ul style="list-style-type: none"> Bubbly has a short lag phase and is a reliable and robust fermenter at temperatures between 8-32°C (47-88°F). This yeast strain has very high alcohol tolerance of 15.5-16.0% v/v. Bubbly is a low foaming strain and flocculates well at the end of fermentation. 	<ul style="list-style-type: none"> Due to its inherent stress tolerance characteristics, Bubbly is the ideal yeast for producing sparkling wine styles using either the méthode champenoise or Charmat methods. With very low total SO₂ production, Bubbly can be used as the primary and secondary fermenter and produces some subtle but positive fruity aromas consistent with high quality sparkling wines. 	High stress tolerant strain good for sparkling wine production.	500g 10kg
Cryo <small>suitable for DIRECT PITCH</small> <ul style="list-style-type: none"> Alcohol tolerance is up to 14.5% v/v. Only low levels of foam are produced with this yeast strain, even at low temperatures. A fermentation aid is strongly recommended for low nutrient juices with this yeast. 	<ul style="list-style-type: none"> Cryo should be used for cold fermentations 10-13°C (50-55°F) in white grape varietals such as Sauvignon Blanc, Chenin Blanc, Semillon and Chardonnay. It can be used in tank or barrel fermentations as it produces a low level of foam during fermentation. The result is a varietal white wine with enhanced ester expression as the aromas are trapped under cold fermentation conditions. For less fruity esters we recommend fermenting warmer at 16-18°C (61-64°F). 	A high cryophilic strain good for cold fermentations.	500g 10kg
Tropica <ul style="list-style-type: none"> Strong fermenter at temperatures ranging between 14-18°C (57-68°F). A fermentation aid is strongly recommended for low nutrient juices and/or fermenting below 14°C (57°F). Alcohol tolerance can reach up to 14% v/v without a fermentation aid, although higher alcohols can be achieved with improved nutrition, particularly toward the end of fermentation. There is some foam produced with this yeast, especially under stressful conditions at low temperatures; we don't recommend fermenting below 13°C (55°F). 	<ul style="list-style-type: none"> Tropica should be used to increase tropical fruit aromas in white wines. It releases guava, passion fruit and pineapple aromas on the nose, with a distinctive guava/lychee character on the palate. It is recommended for use on grape varieties such as Sauvignon Blanc, Chenin Blanc and Colombard. 	High thiol producer – for tropical white wines.	500g 10kg
White Select <small>suitable for DIRECT PITCH</small> <ul style="list-style-type: none"> White Select is a medium rate fermenter at temperatures of 12-24°C (54-75°F) with a longer lag phase than other commercial yeast. If fermenting below 14°C (57°F) this yeast can become sluggish, hence we recommend adding a complex nutrient to achieve the desired result. Alcohol tolerance of this yeast is in the range of 14-15% v/v. White Select is a relatively low foaming yeast. 	<ul style="list-style-type: none"> White Select is a reliable fermenter with the ability to enhance varietal characters of the fruit while still producing fruity and floral aromas suited to high quality white wines. There is a more complex palate produced as a result of the genetic characteristics of this yeast which promotes autolysis in the latter stages of fermentation. Varieties best suited for White Select are Chardonnay, Semillon and Colombard when there is a desire to increase the aromatic intensity and mouthfeel of the wine. 	Promote autolysis – produce complex full body varietal white wines.	500g 10kg

Yeast Product information overview *continued*

	Characteristics	Applications	Advantages	Pack
Complex suitable for DIRECT PITCH	<ul style="list-style-type: none"> Complex has a medium lag phase with a slow to medium fermentation speed at temperatures of 20-29°C (68-84°F). Alcohol tolerance of this yeast is approximately 14.5% v/v. Complex is a low foaming yeast, hence can be used for barrel fermentation. 	<ul style="list-style-type: none"> Complex is a slow to medium fermenter and can be used in all red grape varieties when a contribution to the aroma profile of the wine is required. This yeast produces a good mix of fruity and spicy aromas while still respecting the varietal character of the fruit. Complex is best suited for the Pinot Noir grape variety when a balance of aromas is desired. 	A versatile red wine fermenter – for balanced fruity and spicy red wines.	500g 10kg
Fruit Red suitable for DIRECT PITCH	<ul style="list-style-type: none"> Fruit Red has a small lag phase with a fast fermentation speed at temperatures of 18-29°C (64-84°F). Alcohol tolerance of this yeast is high at approximately 15.5% v/v. Fruit Red is a low to medium foaming yeast; while ideal for tank fermentation, it must be monitored in barrel fermentation at higher temperatures 	<ul style="list-style-type: none"> Fruit Red is a medium to fast fermenter and can be used in all red grape varieties when a strong contribution to the aroma profile of the wine is required. This yeast produces intense red fruit aromas such as raspberry and loganberry, as well as cherry and some dark fruit aromas too. It is best used for consumer-friendly wines with a fruity spectrum, including rosé-style wines. 	Intense red fruit producer – nice fruity red wines.	500g 10kg
Red suitable for DIRECT PITCH	<ul style="list-style-type: none"> Red is a strong fermenter at temperatures of 18-30°C (65-85°F) with a short lag phase. Cooler temperatures below 17°C (63°F) result in a more moderate fermentation rate. Alcohol tolerance of this yeast can reach up to 15.5-16% v/v. Red is a low foaming yeast suitable for barrel fermentations. 	<ul style="list-style-type: none"> Red is a reliable and robust fermenter with very high alcohol tolerance and the potential to enhance colour by not adsorbing high levels of anthocyanins in the grape juice. Red is best suited for varietal winemaking in red grape varietals such as Shiraz/ Syrah, Zinfandel, Cabernet Sauvignon, Grenache and Merlot. We do not recommend this yeast for white winemaking due to application trial results achieved. 	Don't bind anthocyanins – Intense red colour wines	500g 10kg
Red Select suitable for DIRECT PITCH	<ul style="list-style-type: none"> Red Select has a short lag phase with a medium fermentation speed at temperatures of 16-28°C (61-82°F). This yeast requires nutrient supplementation to perform at its best; a complex nutrient with a high amino acid content released from such ingredients as inactive yeast is essential. Alcohol tolerance of this yeast can reach up to 15-16% v/v. Red Select is a low to medium foaming yeast. 	<ul style="list-style-type: none"> Red Select is a good fermenter with the ability to enhance colour and mouthfeel in red wines through the extraction of phenolic compounds in the grape juice. Red Select is best suited for varietal winemaking in red grape varietals such as Cabernet Sauvignon, Merlot and Shiraz/ Syrah. This yeast is best suited to the production of premium, super premium and iconic red wines. 	Good polyphenol extraction – high red colour wines with good mouthfeel.	500g 10kg

*All our wine yeasts (excl AWRI Bioprotect) have a 4 years shelf life from date of manufacture.

Yeast Product information overview *continued*

	Characteristics	Applications	Advantages	Pack
Fructo suitable for DIRECT PITCH	<ul style="list-style-type: none"> Fructo is a strong fermenter at temperatures of 15-30°C (59-85°F) with a short lag phase. Cooler temperatures below 15°C (59°F) result in a more moderate fermentation rate. It has a high alcohol tolerance of up to >19% v/v, with the ability to inoculate in high alcohol conditions to restart fermentation. This yeast is a low foaming strain. 	<ul style="list-style-type: none"> Fructo is an excellent yeast to use in conjunction with high sugar grape juices that will lead to high potential alcohol yield. With an extremely high alcohol tolerance of >19% v/v, Fructo can also be used for stuck and sluggish fermentations of both red and white wines when fructose concentrations are elevated toward the end of fermentation. Fructo should be used on ripe Zinfandel, Durif, Shiraz/Syrah and other high alcohol wines. 	High alcohol tolerance – good for restarting stuck fermentations	500g 10kg
Fructo Select suitable for DIRECT PITCH	<ul style="list-style-type: none"> Fructo Select has a short lag phase with a rapid fermentation speed at temperatures of 16-32°C (61-90°F). Alcohol tolerance of this yeast is very high and one of the rare wine yeast strains that can reach up to 18% v/v. In very high sugar juices with >16% v/v alcohol potential, we do recommend the addition of a complex nutrient to ensure the actively fermenting yeast has enough nutritional supplements to complete the fermentation. Fructo Select is a low foaming yeast. 	<ul style="list-style-type: none"> Fructo Select is a strong fermenter with a high capacity to add structure to high alcohol potential wines in the range of 16-18% (v/v). Fructo Select is best suited for varietal winemaking in red grape varietals such as Zinfandel and Shiraz/ Syrah. This yeast is best suited to the production of high alcohol red wines when there is a desire to minimise volatile acidity and store the wine for a long time. 	Can add structure to high alcohol wines – well balanced structured wines.	500g 10kg
Robust suitable for DIRECT PITCH	<ul style="list-style-type: none"> This yeast has a short lag phase with a wide temperature range between 9-30°C (48-86°F). Alcohol tolerance of up to 16% v/v. Only small amounts of foam are produced with this yeast, thus allowing tanks or barrels to be filled. 	<ul style="list-style-type: none"> Robust should be used for neutral grape varieties when there is a need for the yeast to increase aroma and flavour production. In white wines it produces fruity aromas (banana, pineapple) as well as floral notes (rose petals, violets). In red wines the aromas are more subdued and in line with varietal characteristics of the wine. Most importantly, Robust will reliably ferment difficult juices in extreme conditions, thus adding security of fermentation for the winemaker. 	Reliable fermentations – good for fermenting in extreme conditions with good ester production.	500g 10kg
AWRI Bioprotect suitable for DIRECT PITCH	<ul style="list-style-type: none"> AWRI Bioprotect has a very long lag phase of two to three days; any fermentation of this yeast will be unlikely. As such, a <i>Saccharomyces cerevisiae</i> yeast of choice is possible. Although AWRI Bioprotect is unlikely to ferment, it protects the juice from the moment of addition. This yeast has very low alcohol tolerance of 4-5% v/v. <i>Metschnikowia</i> is an aerobic yeast, thus some foaming is visible after applying this yeast to grapes or grape juice. 	<ul style="list-style-type: none"> AWRI Bioprotect has natural antimicrobial activity that allows this yeast to be used as a bioprotective agent to be added to grapes directly. For good quality grapes with little infection/spoilage, it is possible to partially replace or completely replace the sulphur dioxide if AWRI Bioprotect is combined with other technologies. AWRI Bioprotect can be added to the grape bins in the vineyard as well as to the juice prior to standard yeast inoculation. 	Low nitrogen consumer - does not need nitrogen additions to undergo its bioprotective properties.	500g 10kg

*All our wine yeasts (excl AWRI Bioprotect) have a 4 years shelf life from date of manufacture.



To view our
Product Information Sheets
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Pinnacle™ Bacteria

Malolactic bacteria can play an essential role in winemaking. Malolactic fermentation (MLF) not only converts tart-tasting malic acid, naturally present in grape must, into softer-tasting lactic acid, but also has a direct impact on wine quality. MLF is also crucial to microbiologically stabilise most red wines. It is predominantly strains within the *Oenococcus oeni* family that conduct malolactic fermentation.

AB Bitek has undertaken multiple applications trials on many bacteria strains and identified strains that are temperature tolerant, pH tolerant and resistant to multiple stresses that are encountered post-alcoholic fermentation.

There are a few risks associated with doing spontaneous malolactic fermentation. There is a high probability that an undesirable strain could do the malolactic fermentation and could cause off flavours, but more importantly spontaneous malolactic fermentation can produce toxic metabolites like biogenic amines. The safer option is to inoculate with a commercial starter culture specifically selected for their beneficial properties.



Download detailed information sheets for our full range online at:

pinnaclewineingredients.com

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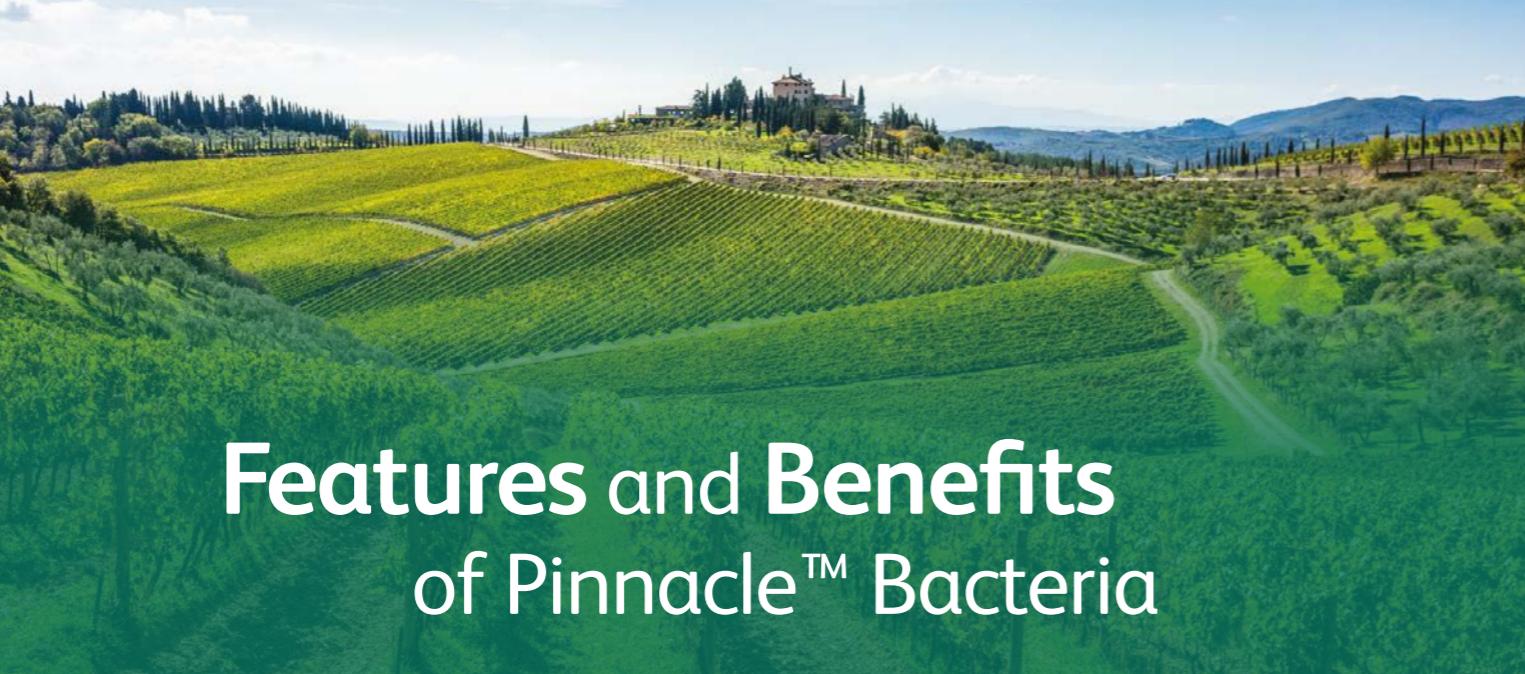


Attributes of Pinnacle™ Bacteria

Product	Type	Application	Dosage
MLF Safe	Pinnacle™ MLF Safe is an innovative blend of two specifically selected pure <i>Oenococcus oeni</i> strains that are synergistically more robust and more stress-tolerant than the individual strains. This blend of bacteria will secure malolactic fermentation in most difficult conditions.	Low pH white wines to high-alcohol red wines	1g/hL
MLF Robust	Pinnacle™ MLF Robust is an <i>Oenococcus oeni</i> strain that was isolated in an extensive screening of novel bacteria under stressful malolactic fermentation conditions.	High-alcohol red wines to low pH wines	1 g/hL
MLF Extreme	Pinnacle™ MLF Extreme is an <i>Oenococcus oeni</i> strain that was isolated in an extensive screening of novel bacteria under stressful malolactic fermentation conditions.	Low pH white wines	1 g/hL

Product information for Pinnacle™ Bacteria

	Characteristics	Applications	Advantages	Pack
MLF Safe	<ul style="list-style-type: none"> Thanks to its high concentration formula and high purity standards, Pinnacle™ MLF Safe can adapt to many different conditions: high alcohol, high concentration in polyphenols, low pH, etc. Pinnacle™ MLF Safe is fast, SO₂ resistant and does not produce detectable biogenic amines. 	<ul style="list-style-type: none"> It covers a wide spectrum of wine applications: from low pH white wines to high-alcohol red wines rich in polyphenols. It ensures stability of the wine and provides softness and aromatic complexity to the wine. Pinnacle™ MLF Safe is suitable for sequential or co-inoculation (except Pinnacle™ Robust). 	Yeast mannoproteins – can lead to complex wines with improved mouthfeel .	25g sachets 250g sachets
MLF Robust	<ul style="list-style-type: none"> Pinnacle™ MLF Robust is a very concentrated, high cell count bacteria suited to malolactic fermentation in difficult conditions, especially high alcohol conditions. Pinnacle™ MLF Robust is fast, SO₂ resistant and does not produce detectable biogenic amines. 	<ul style="list-style-type: none"> Pinnacle™ MLF Robust covers a wide spectrum of wine applications: from high-alcohol red wines rich in polyphenols and greater than 15% v/v ethanol to low pH wines. It provides clean red berries with some spicy notes and soft tannin to the wine. Pinnacle™ MLF Robust is suitable for sequential or co-inoculation. 	Selected for its high alcohol tolerance ability and speed of malolactic fermentation .	25g sachets 250g sachets
MLF Extreme	<ul style="list-style-type: none"> Pinnacle™ MLF Extreme is a very concentrated, high cell count bacteria suited to malolactic fermentation in difficult conditions, especially low pH conditions. It is also suitable to use when cellars start to get colder. Pinnacle™ MLF Extreme is fast, SO₂ resistant and does not produce biogenic amines. 	<ul style="list-style-type: none"> Covers a wide spectrum of wine applications: from low pH white wines (pH~3.0) to low temperatures (-15°C/59°F), ideal for cool climate wines and/or during early onset of winter. It provides clean fruit with some spicy and vanilla notes. Pinnacle™ MLF Extreme is suitable for sequential or co-inoculation. 	Selected for its ability to tolerate low pH conditions and low temperature environments .	25g sachets 250g sachets



Features and Benefits of Pinnacle™ Bacteria

Features of Pinnacle™ Bacteria

	MLF SAFE	MLF ROBUST	MLF EXTREME
Type	Blend of two <i>Oenococcus oeni</i> strains for versatility	<i>Oenococcus oeni</i> strain for high alcohol tolerance	<i>Oenococcus oeni</i> strain for low pH and low temperature tolerance
Characteristics	High concentration, stress-tolerant	High cell count, SO ₂ resistant, free of biogenic amines	Highly concentrated, SO ₂ resistant, free of biogenic amines
Applications	Wide range: low pH white to high-alcohol red wines	High-alcohol red wines (>15% v/v ethanol)	Low pH white wines, cool climate wines when cellars start to get cold
Formulation	Pure concentrated active freeze-dried culture	Pure concentrated active freeze-dried culture	Pure concentrated active freeze-dried culture
Dosage	1 g/hL	1 g/hL	1 g/hL
Packaging	25g and 250g laminate sachets	25g and 250g laminate sachets	25g and 250g laminate sachets
Storage Conditions	Store at -18°C (-0.4°F)	Store at -18°C (-0.4°F)	Store at -18°C (-0.4°F)
Shelf Life	3 years at -18°C; 18 months at 4°C	3 years at -18°C; 18 months at 4°C	3 years at -18°C; 18 months at 4°C
Min - Max Temp	18-27°C (64-81°F)	18-27°C (64-81°F)	15-27°C (59-81°F)
pH Tolerance	≥ 3.2	≥ 3.2	≥ 3.0
Alcohol Resistance	≤ 15 %	≤ 16.5 %	≤ 14.5 %
Fermentation Rate	Fast	Very Fast	Moderate

Benefits of Pinnacle™ Bacteria

	MLF SAFE	MLF ROBUST	MLF EXTREME
Versatility	Suitable for a wide spectrum of wine types	Ideal for high-alcohol red wines	Best for cool climate, low pH wines and cold cellars
Aromatic Contribution	Enhances softness and aromatic complexity	Clean red berries and spice with soft tannins	Clean fruit aromas with spice and vanilla
Performance	Ensures malolactic fermentation even under challenging conditions	Fast and effective in high-alcohol environments	Efficient under low pH and low temperature conditions
Quality Assurance	Fast-acting, SO ₂ resistant, and does not produce detectable biogenic amines	No detectable biogenic amines and consistently high performance	No detectable biogenic amines and consistently high performance
Ease of Use	Direct addition to wine, simple re-hydration instructions for difficult wines	Direct addition to wine, simple re-hydration instructions for difficult wines	Direct addition to wine, simple re-hydration instructions for difficult wines

Overview of Pinnacle™ Bacteria

	MLF SAFE	MLF ROBUST	MLF EXTREME
Min - Max Temp	18-27°C (64-81°F)	18-27°C (64-81°F)	15-27°C (59-81°F)
pH Tolerance	≥ 3.2	≥ 3.2	≥ 3.0
Alcohol Resistance	≤ 15 %	≤ 16.5 %	≤ 14.5 %
Fermentation Rate	Fast	Very Fast	Moderate

Visit our website or contact us...

...to learn how Pinnacle™ MLF Bacteria can elevate your winemaking.

www.pinnaclewineingredients.com
wineinfo@abbiotek.com



Pinnacle™ Tannins

Tannins are polyphenolic compounds that constitute condensed and hydrolysable tannins. The condensed tannins are generally isolated from grape skins and seeds, as well as quebracho and mimosa plants. The hydrolysable tannins are either ellagic or gallic and are mainly derived from oak or chestnut trees.

AB Bitek has selected tannins with a wide range of properties to suit winemakers' requirements. Commercially available tannin products fall into three categories:

- Fermentation tannins
- Ageing tannins
- Finishing tannins



Tannins explained

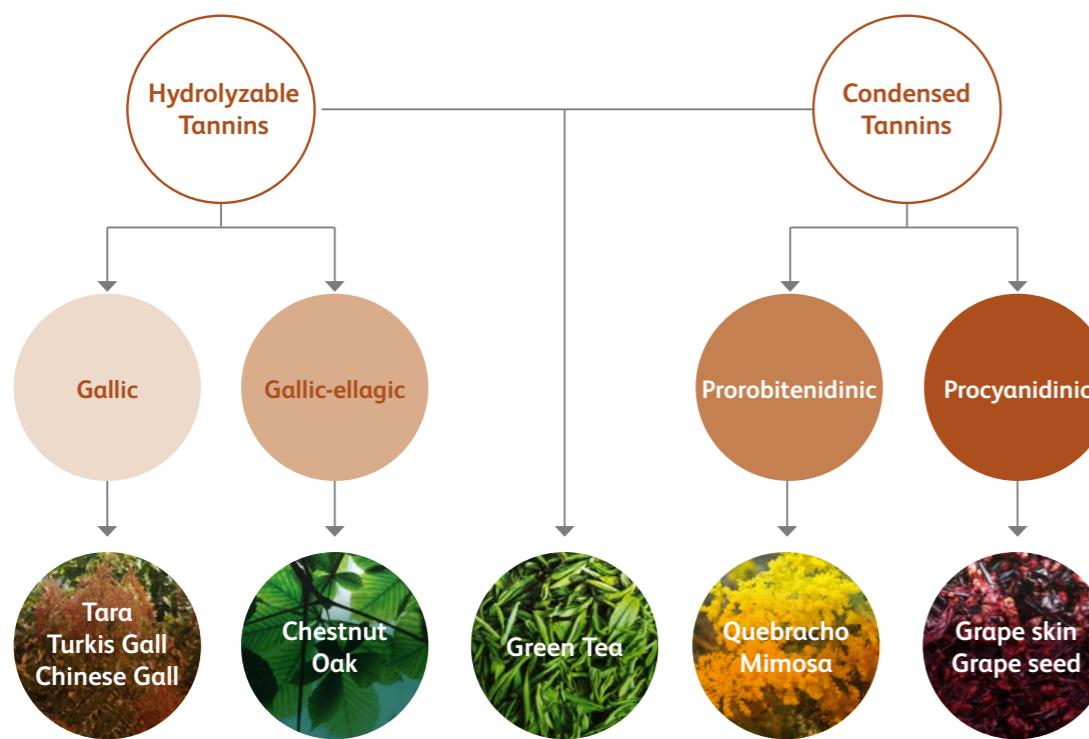


Tannins play a fundamental role in defining the taste and colour of wine. Tannins help to stabilise the colour in wine. During fermentation, anthocyanins can bind with proteins and sediment out.

If tannins are present, they will bind with the proteins instead of the anthocyanins; these types of tannins are often called **sacrificial tannins**.

Tannins can also directly bind with anthocyanins to form stable dissolved pigments and this helps to preserve the colour of wine. Apart from this, tannin can also act as an antioxidant (chemical and enzymatic oxidation) and preservative in wine.

Tannins bind to protein surfaces and can inhibit enzymatic activity, including that of laccase, at concentrations less than it takes to actually facilitate precipitation and removal.



Attributes of Pinnacle™ Tannins

Product	Type	Application	Dosage
Color Tan	Condensed & ellagic tannin (no quebracho)	Red wine – colour stabilisation & protection	10-30g/hL
Structure Tan	Condensed & ellagic tannin (no quebracho)	Red wine – removes green/vegetal characters	10-30g/hL
Natura Tan	Ellagic tannin (limousine)	White, Rosé & Red wine - antioxidant	1-10g/hL
HT Tan	Ellagic tannin (oak)	Red wine – increased wood/vanilla aroma	1-5g/hL
Seed Tan	Condensed tannin (grape seeds)	Red wine – colour stability	1-15g/hL

Pinnacle™ Tannins product information

The tables that follow provide an overview of the Pinnacle™ tannins range. Detailed information sheets can be found online at pinnaclewineingredients.com

Characteristics	Applications	Advantages	Pack
Natura Tan	<ul style="list-style-type: none"> Pinnacle™ Natura Tan provides a stable anti-oxidative environment to the wine for a quality ageing process. Pinnacle™ Natura Tan releases sweet and complex soft tannins, enhancing fruity flavours and volume of the wine. 	<ul style="list-style-type: none"> Pinnacle™ Natura Tan can be added at any time. When used during ageing, after malolactic and/or pre-bottling, it reinforces white, rosé and red wines with pleasant, sweet and persistent tannic notes. By increasing ellagic tannin concentration in wine, Pinnacle™ Natura Tan maximises wood contact effect, thus optimising ageing conditions in new or used barrels. 	Ellagic tannin for wine ageing – enhancing the fruity flavours in wine . 1kg bags
Color Tan	<ul style="list-style-type: none"> When added early in maceration, Pinnacle™ Color Tan inactivates oxidative enzymes, precipitates grape proteins and preserves endogenous tannins. When added later in maceration, Pinnacle™ Color Tan promotes polymerisation and stabilisation of polyphenolanthocyanin by ethyl bridge mechanism. 	<ul style="list-style-type: none"> Pinnacle™ Color Tan protects the aromatic profile of the wine, enhancing a brighter and more stable colour. Pinnacle™ Color Tan contributes to a more stable tannic structure with high anthocyanin content. Pinnacle™ Color Tan is a powerful antioxidative tool that inhibits tyrosinase and laccase enzymatic activities (e.g. in botrytised grapes) and completes the action of SO₂ thus avoiding overdoses of sulphites in wine. 	An ellagic tannin proanthocyanidins blend for colour and polyphenol stabilisation – for long lasting stable wines . 1kg bags 15kg bags

Characteristics	Applications	Advantages	Pack
HT Tan	<ul style="list-style-type: none"> Pinnacle™ HT Tan is a complex ellagic tannin extracted from toasted French oak. Pinnacle™ HT Tan can be added at any time (ageing, after MLF or pre-bottling) and it reinforces red wines with sweet and well balanced tannic notes. 	<ul style="list-style-type: none"> By instantly increasing ellagic tannins concentration in wine, Pinnacle™ HT Tan improves barrel effect and mimics ageing in new highly toasted barrel. Pinnacle™ HT Tan is great tool to get richer aromatic red wines with more complex and persistent palate. 	Toasted French oak ellagic tannin complex – for complex wooded well-balanced wines. 1kg bags
Seed Tan	<ul style="list-style-type: none"> Pinnacle™ Seed Tan is the perfect tool to support micro-oxygenation as it promotes polymerisation and stabilisation of polyphenolanthocyanin by ethyl bridge mechanism. Pinnacle™ Seed Tan stabilises colour by naturally integrating the polyphenolic structure of wines while reversing the oxidation process. Pinnacle™ Seed Tan is very reactive with sulphured compounds and removes ethanethiol, methanethiol and their precursors (ethyl-thioacetate, methyl-thioacetate). Pinnacle™ Seed Tan compensates natural grape tannin deficiency and decreases astringency of the wine. 	<ul style="list-style-type: none"> Pinnacle™ Seed Tan can be used to support the ageing process of red wines or to add immediate structure and concentration at pre-bottling. Pinnacle™ Seed Tan decreases reductive notes that can occur in case of late racking. Pinnacle™ Seed Tan improves low body red wines made from unripe grapes with a more balanced polyphenolic structure and greater palate length. 	Seed proanthocyanidins mix with chestnut ellagic tannins for colour stabilisation and polyphenol polymerisation – for more easy drinking, softer, stable wines. 1kg bags
Structure tan	<ul style="list-style-type: none"> Pinnacle™ Structure Tan particularly contributes to structure and aromatic stability, improving bouquet and drinkability of red wine. When added early in maceration, Pinnacle™ Structure Tan inactivates oxidative enzymes, precipitates grape proteins and preserves endogenous tannins. When added later in maceration, Pinnacle™ Structure Tan promotes polymerisation and stabilisation of polyphenolanthocyanin by ethyl bridge mechanism. It also removes vegetal and geosmin unpleasant aromas, thus enhancing fruity notes. When added post fermentation, Pinnacle™ Structure Tan protects the wine from oxidation and contributes to aromatic complexity. 	<ul style="list-style-type: none"> Pinnacle™ Structure Tan adds mouthfeel and prevents oxidation and colour loss of all red wines. Pinnacle™ Structure Tan contributes to a more stable tannic structure with high anthocyanin content. Pinnacle™ Structure Tan is a powerful anti-oxidative tool that inhibits tyrosinase and laccase enzymatic activities (e.g. in botrytised grapes) and completes action of SO₂ thus avoiding overdoses of sulphites in wine. Pinnacle™ Structure Tan is useful when you cannot remove the seeds from the wine as it removes vegetal notes while enhancing varietal flavours. 	Complex tannin mixture for premium red wines – for softer, riper, drinkable aromatic wines. 1kg bags 15kg bags



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Pinnacle™ Enzymes



Enzymes play a definitive role in the ancient and complex process of winemaking. From a scientific and technical point of view, wine can be seen as the product of enzymatic transformation of grape juice. From the pre-fermentation stage, through fermentation, post-fermentation and ageing, enzymes are the major driving forces catalysing various biotransformation reactions.

Imagine a pair of scissors cutting a piece of paper again and again and again, resulting in many smaller pieces of paper; that is exactly how an enzyme works in grapes and wine. Whether it be for clarification, extraction, filtration or other purpose, **enzymes are simply a natural ingredient to accelerate reactions**. AB Biotek has collaborated with leading enzyme manufacturers to identify the most efficient and highly active enzymes available in the wine market today. Dosage rate, time and temperature are the three critical parameters to consider when adding enzymes to grape juice or wine.



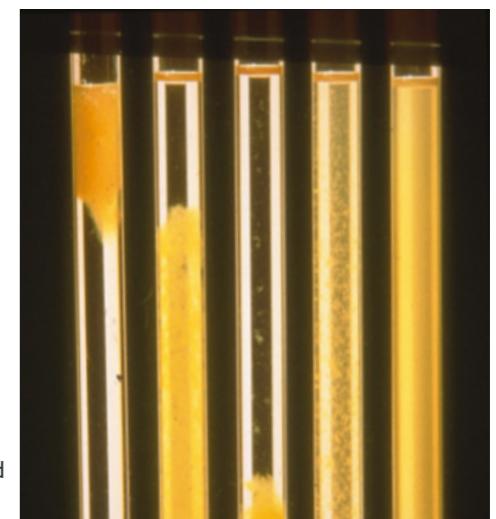
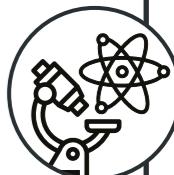
Pectin test 1:2

1 part of juice + 2 parts of acidified ethanol

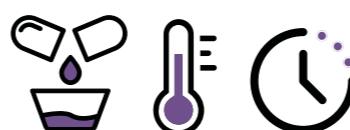
Evaluation after 8 - 10 minutes

Positive : Gel formation and flocculation (all samples except the right)

Negative : Homogen cloudy - no flocculation (right)



Enzymes are the major driving forces catalysing various biotransformation reactions dependent on dose, temperature and time.



Pectin is a gel like substance that keeps fruit cells and fibers together and if pectin is not completely broken down during fermentation winemakers can end up with a pectin haze in their wines. Normally, a winemaker use pectinolytic enzymes (pectinases) to degrade these pectins. A winemaker can perform a quick and easy pectin test to see how successful these pectinases were in degrading the pectin and if their wines would be safe from these pectin hazes. A positive test indicates that not all pectin was degraded and the winemaker will need to repeat the enzymatic step. A negative test indicates that the enzymatic degradation was successful and the wines are safe from pectin hazes.

Attributes of Pinnacle™ Enzymes

Enzyme Product information overview continued

Product	Type	Application	Dosage	Packaging (kg)
Zym Clarify	Liquid Pectinase	Settling	2-4 ml/hL	1kg 25kg
Zym Clarify+	Liquid Pectinase	Clarification	1.5-4 ml/hL	1kg 25kg
Zym Color	Granulated Pectinase; cellulase and β-glucanase side activity	Colour and polyphenol extraction	3g/100kg	25kg
Zym Flot	Liquid Pectinase	Flotation	3-6 ml/hL	1kg 25kg
Zym Ruby	Liquid Pectinase	Aroma and colour extraction	3-5 ml/100kg	1kg 25kg
Zym White Extract	Liquid Pectinase	Rapid juice extraction	3-5 ml/100kg	1kg 25kg

Characteristics	Applications	Advantages	Pack
Zym Color	<ul style="list-style-type: none"> Pinnacle™ Zym Color is a concentrated granulated pectinase enzyme with cellulase and β-glucanase side activities, specifically formulated to accelerate colour and polyphenol extraction. The increased anthocyanin-polyphenol polymerisation stabilises colour and softens the tannins. Using Pinnacle™ Zym Color limits punchdowns and racking thus avoiding bitter tannins and astringency. 	<ul style="list-style-type: none"> Treatment with Pinnacle™ Zym Color increases colour extraction and stability. Pinnacle™ Zym Color facilitates draining, pressing, clarification and filtration of the wine. Pinnacle™ Zym Color is used in maceration and cold soaking. Pinnacle™ Zym Color is particularly recommended for full bodied red wines with complex aromatic profile, better structure and softer tannins. 	For fast colour and polyphenol extraction – can lead to earlier drinkable wines.
	<ul style="list-style-type: none"> Pinnacle™ Zym Flot is a fast liquid pectinase: rapid depectinisation reduces viscosity of the must. It enables faster flotation of solid particles to the top of the vessel. 	<ul style="list-style-type: none"> Pinnacle™ Zym Flot eases agglomeration of floating particles, thus increasing flotation yields. It clarifies juices and reduces flotation time, thus preventing risk of early fermentations. Pinnacle™ Zym Flot enhances aromatic freshness of white and rosé wines. 	For rapid flotation of white and rosé wines in earlier finished wines.
Zym Ruby	<ul style="list-style-type: none"> Pinnacle™ Zym Ruby breaks down grape pectin chains, enabling a quicker extraction of aroma precursors contained in red grape skins. Secondary activity of hemicellulase in Pinnacle™ Zym Ruby facilitates colour and tannin extraction. Pinnacle™ Zym Ruby reduces maceration time and increases free-run juice yields. The pectinase lyses the pectin substances improving clarification of the must with more compact sediments. 	<ul style="list-style-type: none"> Pinnacle™ Zym Ruby is optimum for light, aromatic, ready to drink reds. Suitable for maceration and cold soaking. When used on thermo-treated grapes, Pinnacle™ Zym Ruby improves pressability. 	For faster maceration – can lead to dark red fuller body wines.
	<ul style="list-style-type: none"> Pinnacle™ Zym White Extract reduces the viscosity of the mash, which allows easier pressing. Using Pinnacle™ Zym White Extract eases juice extraction with shorter pressing cycles and higher juice yields. Reduced time in the press preserves must from oxidation, thus extracting all the aromatic and colour potential of grapes. The pectinase lyses the pectin substances, hence improving clarification of the must. 	<ul style="list-style-type: none"> Pinnacle™ Zym White Extract is used in white and rosé wine production to improve juice extraction and clarification of the must. It extracts more varietal aromas from grapes, thus increasing aromatic potential of the wine. 	Maximise juice and aroma extraction – more aromatic wines.

Pinnacle™ Enzymes product information

The tables that follow provide an overview of the Pinnacle™ enzymes range. Detailed information sheets can be found online at pinnaclewineingredients.com

Characteristics	Applications	Advantages	Pack
Zym Clarify	<ul style="list-style-type: none"> Pinnacle™ Zym Clarify enables quick depectinisation, reduces viscosity and turbidity of must during settling. 	<ul style="list-style-type: none"> Pinnacle™ Zym Clarify is a versatile clarifying enzyme suitable for white/rosé musts. Pinnacle™ Zym Clarify shortens settling step by delivering more compact lees and a clearer must. 	<ul style="list-style-type: none"> For fast and compact settling of juice – less juice and wine losses.
Zym Clarify+	<ul style="list-style-type: none"> Pinnacle™ Zym Clarify+ enables quick depectinisation of the must/wine. Pinnacle™ Zym Clarify+ reduces viscosity and turbidity of must, even when settling conditions are difficult. Pinnacle™ Zym Clarify+ is Cinnamoyl Esterase (CE) Free. 	<ul style="list-style-type: none"> Pinnacle™ Zym Clarify+ speeds up clarification of all white and rosé musts, as well as turbid thermo-treated red musts and red press wines. Settling step is shortened delivering more compact lees and a clearer must. Pinnacle™ Zym Clarify+ is recommended for hard to settle grape varieties with high pectin concentrations as well as low pH and/or low temperature juices. Pinnacle™ Zym Clarify+ enhances aromatic finesse of white and rosé wines and cost of red winemaking. 	<ul style="list-style-type: none"> For fast clarifications of juice – clean, elegant white wines.

Characteristics	Applications	Advantages	Pack
Zym White Extract	<ul style="list-style-type: none"> Pinnacle™ Zym White Extract reduces the viscosity of the mash, which allows easier pressing. Using Pinnacle™ Zym White Extract eases juice extraction with shorter pressing cycles and higher juice yields. Reduced time in the press preserves must from oxidation, thus extracting all the aromatic and colour potential of grapes. The pectinase lyses the pectin substances, hence improving clarification of the must. 	<ul style="list-style-type: none"> Pinnacle™ Zym White Extract is used in white and rosé wine production to improve juice extraction and clarification of the must. It extracts more varietal aromas from grapes, thus increasing aromatic potential of the wine. 	Maximise juice and aroma extraction – more aromatic wines.



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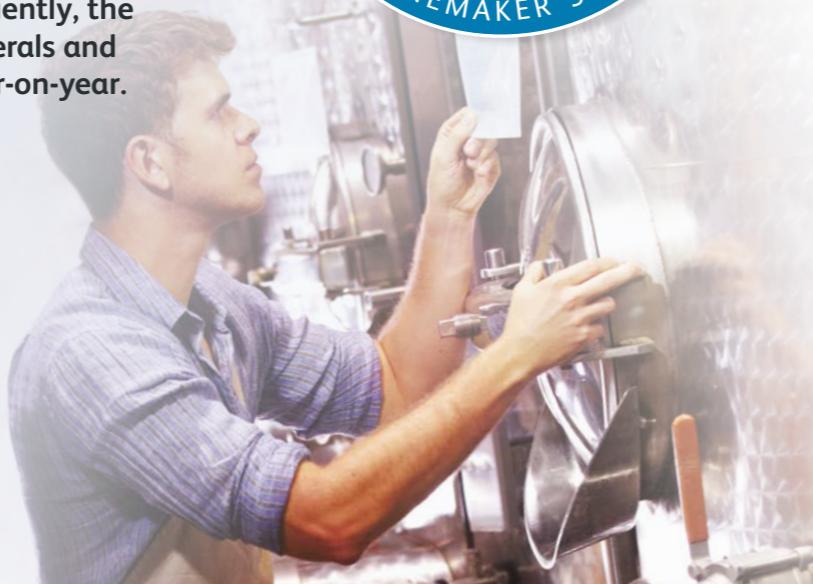
Pinnacle™ Fermentation Aids



Grape juice composition is highly variable and heavily dependent on the terroir, vintage climate conditions and viticultural practices. Consequently, the concentration of sugars, acids, vitamins, minerals and other elements in the grapes will change year-on-year.

Furthermore, vineyard spray programs can radically affect the levels of pesticides and fungicides within a grape juice. These factors combined can lead to imbalanced grape juices that result in difficult conditions for the yeast to operate efficiently and effectively.

AB Biotek's leading research scientists have identified various inactivated yeast and blends thereof that, when added to grape juice, minimise the annual variation of grape juice composition. Ultimately, this reduces the chances of stuck and sluggish fermentations, thus leading to better overall wine quality.



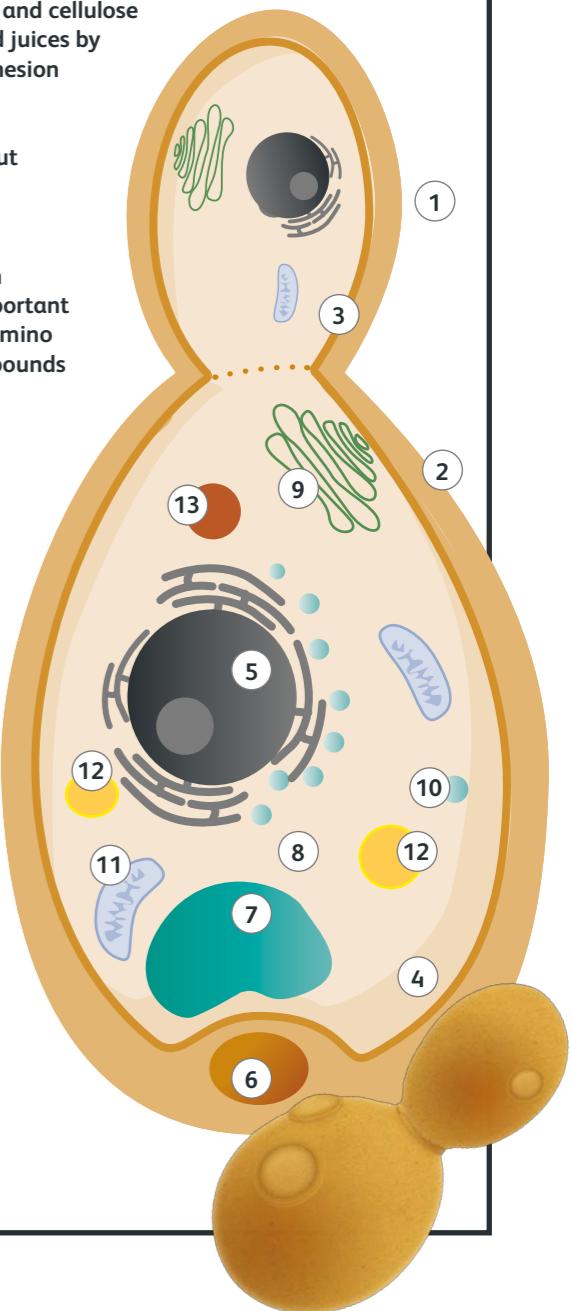
Fermentation Aids explained

Inactivated yeast normally consists of the whole yeast killed by heat. It contains the cell walls, the cell membranes and the inside of the yeast.

Yeast hulls are the insoluble yeast cell wall fractions and play an important role by absorbing toxins from the juice. They are also an important source of sterols and unsaturated fatty acids. Yeast hulls and cellulose can help diminish sluggish fermentations in over-clarified juices by increasing the surface area for the yeast and provide adhesion points for the yeast.

Yeast extract consists of all the cell components without the cell walls and cell membrane parts. Yeast extract is a good source of amino acids.

Amino acids play an essential role in winemaking as an important nutritional factor for yeast and due to the important role they play in protein synthesis and sugar transport. Amino acid metabolism is directly related to many flavour compounds and, therefore, very important for the quality of wine.



Attributes of Pinnacle™ Fermentation Aids

Product	Ingredients				Application	N %	OIV Approved
	Inactivated Yeast	Cell walls	Enriched yeast extract	Cellulose			
FermiFresh			✓		Antioxidant – improved colour and flavour	7.1	✓
FermiSafe	✓	✓		✓	Detoxifies grape juice; reduced sluggish and stuck ferments	6.5	✓
FermiTop		✓	✓		Enhancing aroma and complexity	8.7	✓

Pinnacle™ Fermentation Aids product information

The tables that follow provide an overview of the Pinnacle™ fermentation aids range. Detailed information sheets can be found online at pinnaclewineingredients.com

Characteristics	Applications	Advantages	Pack
FermiFresh	<ul style="list-style-type: none"> Pinnacle™ FermiFresh is an organic (ammonium salt-free) nutrient for white and rosé wines. Gradual release of amino acids, unsaturated fatty acids, sterols and other growth factors enable complete and safe fermentation. 	<ul style="list-style-type: none"> Wines fermented with Pinnacle™ FermiFresh, show a better resistance to oxidation during ageing, with fresher aromas, brighter colour and enhanced complexity. When used in white reductive winemaking conditions, Pinnacle™ FermiFresh preserves the original varietal aromas of Sauvignon Blanc, Riesling, Pinot Grigio and Chenin Blanc, enhancing a fresher, varietal, aromatic bouquet. In rosé winemaking, the antioxidant components of Pinnacle™ FermiFresh allow the optimal stabilisation of colour through the interaction of anthocyanins with polyphenols, thus inhibiting the browning effect. To optimise the preservative effect of Pinnacle™ FermiFresh, it is recommended to complement yeast nutrition with ammonium salts. 	<p>Wine protection – for longer lasting aromatic white and rose wines.</p> <p>1kg bag 15kg bag</p>
FermiSafe	<ul style="list-style-type: none"> Pinnacle™ FermiSafe provides physical support elements for the inoculated yeast to better disperse into the medium, thus shortening fermentation lag-phase. Inactivated yeast contained in Pinnacle™ FermiSafe provides survival factors (sterols) and gradually releases amino acids during fermentation. Cellulose contained in Pinnacle™ FermiSafe also creates nucleation sites which avoid the toxicity effect of CO₂ accumulation in the bottom of fermenting vessels. By using Pinnacle™ FermiSafe, you assure a complete, safe fermentation with enhanced aromatic complexity of your wine. 	<ul style="list-style-type: none"> Pinnacle™ FermiSafe is a detoxifying fermentation aid ideal to avoid sluggish/stuck fermentations. Yeast cell walls adsorb medium-chain fatty-acids and residual pesticides. 	<p>Pinnacle™ FermiSafe is a detoxifying fermentation aid ideal to avoid sluggish/stuck fermentations.</p> <p>Yeast cell walls adsorb medium-chain fatty-acids and residual pesticides.</p> <p>1kg bag 15kg bag</p>
FermiTop	<ul style="list-style-type: none"> Pinnacle™ FermiTop is an ammonium salt-free yeast nutrient. Pinnacle™ FermiTop is a very rich source of free amino acids, vitamins, minerals, unsaturated fatty acids and sterols which are immediately available for the yeast and improve cellular multiplication, viability and vitality of the cells. Pinnacle™ FermiTop provides amino acids for synthesis of transport proteins and enzymes. Gradual release of growth factors enables complete and safe fermentation. The large availability of amino acids ensures a complete and rich enzymatic pool for the yeast cells which increase aroma synthesis. Release of polysaccharides increases the mouthfeel. 	<ul style="list-style-type: none"> Pinnacle™ FermiTop enhances varietal character of top quality red wines. This is a great tool to improve fermentation of over-ripe grapes with low YAN and high alcohol content, enhancing more intense aromas and greater mouthfeel. Pinnacle™ FermiTop is also recommended for highly clarified white and rosé wine fermentations at low temperature. We recommend using an aromatic yeast strain to maximise the synthesis of secondary aromas. 	<p>Complete food source – for aromatic full body wines.</p> <p>1kg bag 15kg bag</p>



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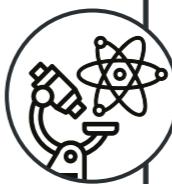
Pinnacle™ Polysaccharides

There have been substantial changes to wine consumption trends in the last two decades. While some wines are cellared for long periods, most wine purchased from retailers these days is consumed very quickly. Many winemakers are therefore seeking ingredients that can speed up the ageing process and add mouthfeel and complexity many years in advance.

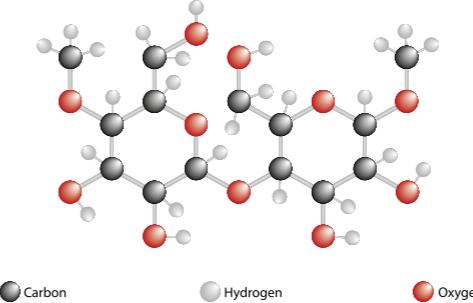
Certain long-chain molecules called polysaccharides that are made up of many sugar units have this capability. AB Biotek has seen this increasing trend in rapid consumption and, as such, we have identified a set of polysaccharides that add enormous value to the winemaking process.



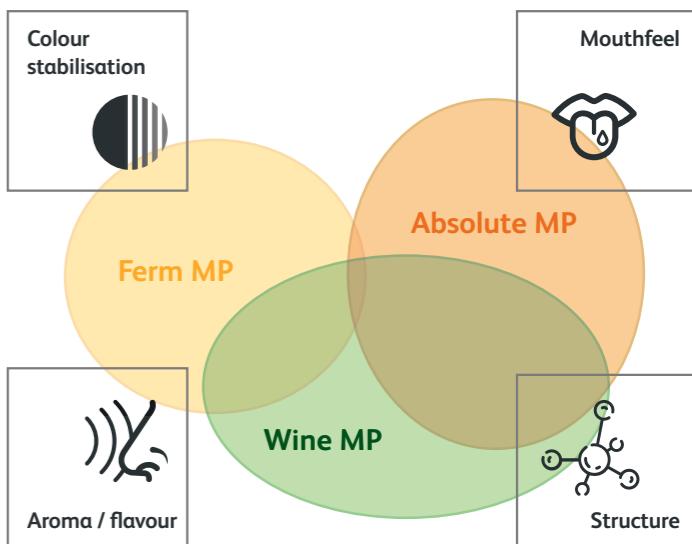
Polysaccharides explained



Polysaccharides are carbohydrates consisting of numbers of sugar molecules bonded together. The three main polysaccharide groups in the external layer of yeast cell walls are: beta-glucans, polymers of mannose and chitin. Yeast mannoproteins, for example, can consist of 20% protein and 80% D-mannose. These mannoproteins have interactions with polyphenols in wine but also with salivary proteins in your mouth. These interactions help to make the wine taste softer and can also improve the mouthfeel. Using a scientific approach, fractions of these molecules can be isolated with a precise length that contributes a designated flavour profile in wine. AB Biotek researchers have identified the optimum length polysaccharides that add carrying layers of mouthfeel and flavour enhancement to wine.



Attributes of Pinnacle™ Polysaccharides



Attributes of Pinnacle™ Polysaccharides

Product	Type	Application	Dosage
Absolute MP	Pure soluble yeast mannoproteins	White and Red wine - stabilisation , improved mouthfeel and flavour . For easy use in low and no alcohol wines	1-5 g/hL
Ferm MP	100% specific inactivated yeast containing fragments of cell walls with highly reactive mannoproteins for early colour stabilisation and smoothing effect	Red wines - Stabilise colour, harsh tannins	25-40 g/hL
Wine MP	100% inactivated yeast containing highly reactive mannoproteins and soluble mannoproteins	Red wines - Builds structure, contributes to stabilisation and preserves colour	5-10 g/hL for white and rose wines 10-15 g/hL for red wines

Pinnacle™ Polysaccharides product information

The tables that follow provide an overview of the Pinnacle™ polysaccharides range. Detailed **information sheets** can be found online at pinnaclewineingredients.com

Absolute MP	Characteristics	Applications	Advantages	Pack
	<ul style="list-style-type: none"> Pinnacle™ Absolute MP is a pure yeast mannoprotein extracted from yeast cell walls and is completely soluble. Pinnacle™ Absolute MP has a clear smoothing effect by reducing astringency of aggressive grape and wood tannins. <ul style="list-style-type: none"> Pinnacle™ Absolute MP is a solution to improve mouthfeel and complexity of white and red wines aged in oak or stainless steel. Pinnacle™ Absolute MP contributes to protein and tartaric stabilisation of the wine. Pinnacle™ Absolute MP has an immediate and obvious sensorial effect, improving mouthfeel and flavour of the wine. Requires 12 to 48 hours (depending on temperature) to be 100% dissolved into wine, ready for bottling. Pinnacle™ Absolute MP addresses the global trend for Low and No Alcohol wines. It enhances the mouthfeel and texture of wines, which often lose flavour and aroma during the dealcoholisation process. The product is easily dispersible at low dosage rates, leaving no residue, making it ideal for no and low alcohol wines. 	<ul style="list-style-type: none"> Pinnacle™ Absolute MP is a solution to improve mouthfeel and complexity of white and red wines aged in oak or stainless steel. Pinnacle™ Absolute MP contributes to protein and tartaric stabilisation of the wine. Pinnacle™ Absolute MP has an immediate and obvious sensorial effect, improving mouthfeel and flavour of the wine. Requires 12 to 48 hours (depending on temperature) to be 100% dissolved into wine, ready for bottling. Pinnacle™ Absolute MP addresses the global trend for Low and No Alcohol wines. It enhances the mouthfeel and texture of wines, which often lose flavour and aroma during the dealcoholisation process. The product is easily dispersible at low dosage rates, leaving no residue, making it ideal for no and low alcohol wines. 	<ul style="list-style-type: none"> Yeast mannoproteins – can lead to complex wines with improved mouthfeel. 	500g plastic can

Polysaccharides Product information overview continued

	Characteristics	Applications	Advantages	Pack
Ferm MP	<ul style="list-style-type: none"> Pinnacle™ Ferm MP is an organic (ammonium salt-free) yeast derivative Slow release of amino acids regulates fermentation and gives a fresher aromatic profile (floral). The lysis of yeast cell walls releases mannoproteins. High molecular weight mannoproteins interact with polyphenols and form stable soluble complexes which preserve colour and increase mouthfeel. Pinnacle™ Ferm MP provides mouthfeel, colour stabilisation and nutrition at the same time. 	<ul style="list-style-type: none"> Pinnacle™ Ferm MP is a great tool for all red wines to: <ul style="list-style-type: none"> Stabilise the colour Round green/harsh tannins Integrate the structure of full bodied red wines. Pinnacle™ Ferm MP does not interfere with the varietal aromatic expression of the wine and provides a brighter red colour. Pinnacle™ Ferm MP is ideal for high quality wine to be aged in wood, or to shorten the wine ageing step (e.g. early bottled wines or large volumes in bulk). 	<ul style="list-style-type: none"> Inactive yeast – can lead to aromatic, colour stable full-bodied wines. 	1kg bag 15kg bag
Wine MP	<ul style="list-style-type: none"> Pinnacle™ Wine MP is a blend of specific hydrolysed yeast cell walls that have a high concentration of naturally occurring mannoproteins. Pinnacle™ Wine MP is odourless and there are no dying cells thus no risk of off-flavour. Pinnacle™ Wine MP generates clean, pure enological, non-reductive lees, with no risk of contamination from its addition. Ageing wine with Pinnacle™ Wine MP: <ul style="list-style-type: none"> Smoothes grape and wood tannins of red wines. Contributes to aromatic complexity. Enhances flavour and roundness of the wine. 	<ul style="list-style-type: none"> Pinnacle™ Wine MP is the solution to build structure in the wine after alcoholic fermentation. Pinnacle™ Wine MP contributes to protein and tartaric stabilisation of the wine. Pinnacle™ Wine MP provides the advantages of a long “bâtonnage” with shortened time (15 days vs 15 months!) and thus optimises cost. Pinnacle™ Wine MP preserves and stabilises the colour of top quality red wines aged in stainless-steel or wood. 	<ul style="list-style-type: none"> Yeast cell walls – for well preserved, stable long-lasting wine. 	500g plastic can



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Pinnacle™ Functional Products



Attribute information for Pinnacle™ Mycobrio

Product	Type	Application	Dosage
Mycobrio	Pinnacle™ Mycobrio is a chitosan based preparation of fungal origin, specifically designed for microbial stabilisation of must and wine.	A natural way to control spoilage microorganisms.	Preventative: 5-10 ml/hL Curative: 10-15 ml/hL

Product information for Pinnacle™ Mycobrio

Characteristics	Applications	Advantages	Pack
Mycobrio <ul style="list-style-type: none">Pinnacle™ Mycobrio is a chitosan based preparation with high antimicrobial activity.Pinnacle™ Mycobrio is stored in an acidic solution that means it is already pre-activated and will start to work immediately.Pinnacle™ Mycobrio facilitates the elimination of most native grape bacteria and yeast (<i>Brettanomyces</i>, <i>Zygosaccharomyces</i>, <i>Oenococcus</i>, <i>Lactobacillus</i>, <i>Acetobacter</i>, etc) that can alter the organolptic characteristics of wine.At the recommended doses, it does not affect the normal course of alcoholic fermentation.Pinnacle™ Mycobrio is allergen-free, gluten-free, vegan-friendly and kosher.	<ul style="list-style-type: none">By using this product at different stages of the winemaking process, different outcomes can be achieved. This tool helps winemakers to have more control over the winemaking process, especially to manage the naturally occurring microflora.Pinnacle™ Mycobrio can be used in one or more successive additions to maintain inhibition on the spoilage microorganisms.	Specifically designed for microbial stabilisation of must and wine.	1L and 10L container



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Enzymes

Yeast

Fermentation Aids

Polysaccharides

Tannins

Bacteria

Functional Products

The winemaker's choice for a premium wine with minimal fuss in the winery.

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