The Oenobrands People
Introducing Oenobrands  

The wine team  

Enzymes: 
- New: Rapidase Rosé  
- Rapidase Maxífruit  
- Enzyme selection tool  

Yeast: 
- Anchor Exotics SPH red wine application  
- New: Fermicru Rosé  
- Fermichamp  
- Fermicru, Fermivin, Collection Cépage yeast selection tool  

Bacteria: 
- Anchor NT 202 Co-Inoculant industry feedback  

Nutrients:  
- New: Natuferm  
- Wine yeast nutrients 101  

Ordering and payment details  

Banking details
Oenobrands is a 50:50 joint venture between Anchor Yeast and the Wine division of DSM Food Specialties. It operates independently from its parent companies and officially started on 1 May 2010. Its multinational and multi-skilled team of 18 people focus exclusively on Biotechnology products Yeast, Yeast Nutrients, Bacteria, Enzymes and Mannoproteins.

Oenobrands designs, invents and brings to the market oenological products of today and tomorrow. Its permanent innovation strategy creates solutions for the ambitions and desires of the modern winemaker and ultimately the end consumer. The person that really counts!

Oenobrands is unique in that both of its parent companies are world class primary producers of yeast and enzymes. With main offices in Cape Town, South Africa and Montpellier, France and its own dedicated and fast distribution system, Oenobrands is ready to support winemakers over 40 countries in the world.

Oenobrands distributes its brands:

- Anchor®
- Rapidase®
- Claristar®
- Fermicru®
- Collection Cépage®
- Fermivin®
- Maxaferm®, Extraferm® & Natuferm®
- Delvozyme®

- on the five continents through a specialised network.

For more information on the company and its brands go to:

http://www.oenobrands.com/
THE WINE TEAM

Margaret Fundira (M.Sc. MBA)
Business Development Manager
mfundira@anchor.co.za
082 883 4439

Lida Malandra (M.Sc)
Area Manager
lmalandra@anchor.co.za
082 907 0171

Bernard Mocke (M.Sc)
Technical Consultant
bmocke@anchor.co.za
082 881 2943

Sebastian Petersen
Ordering and deliveries
spetersen@anchor.co.za
021 534 1351

Karien O’Kennedy (M.Sc)
Online Communications Manager
kokennedy@anchor.co.za
082 903 0694

Mmule Masalesa (B.Sc)
Technical Consultant
mmasalesa@anchor.co.za
082 882 3539

Kathy Kedzior
Administrative Officer
kkedzior@anchor.co.za
021 534 1351

Anchor Wine Yeast Office
All queries
wineyeast@anchor.co.za
021 534 1351
NEW PRODUCT: Rapidase Rosé

Winemakers are currently using either white wine settling enzymes or red wine maceration enzymes for the production of rosé. With the production of rosé escalating worldwide, winemakers are searching for tailored tools that will enable them to be successful in a very competitive market. The two most important quality objectives in rosé production are:

- A reproducible colour that is stable
- A fresh and fruity aroma and flavour

Oenobrands, in an answer to winemaker’s needs, has developed an enzyme specifically for rosé production that perfectly meets these objectives. The enzyme is marketed under the Rapidase brand as Rapidase Rosé.

So what are the unique attributes of Rapidase Rosé?

- It is the WORLD’S FIRST wine enzyme specifically developed for rosé
- It has been extensively tested and approved by numerous wineries in Europe and Argentina as well as in the ‘Centre du rosé’ in France, the institute dedicated to rosé winemaking techniques.
- It contains the optimal set of side activities for precise aroma precursor, polyphenol and yield management
- It contains very low levels of anthocyanases thus ensuring colour stability
- A once-off enzyme addition is adequate, the timing of which determines the style of rosé desired

For the production of rosés from Cabernet Sauvignon, Merlot and Shiraz grapes with explosive red berries and a twist of grapefruit aroma we recommend the combination of Rapidase Rosé and Fermicru Rosé.

For the production of rosé from Pinotage with strawberry, raspberry and cherry aromas we recommend Rapidase Rosé in combination with Anchor VIN 13.
**Rapidase Maxifruit** -

**Patrice explains:**

*Charles***: What is Rapidase Maxifruit?

**Patrice**: It is a red wine macerating enzyme.

*Charles*: What does it consist of?

**Patrice**: It is a combination of different types of pectinases and other enzymatic side activities.

*Charles*: [Yawn] What makes it so special then? Sounds like any other red wine enzyme.

**Patrice**: Well, it contains a very specific side activity that other red wine enzymes don’t.

*Charles*: Really? And that would be?

**Patrice**: Cinnamyl esterase

*Charles*: Cinnamyl WHAT? Whatever... never mind. What does it do?

**Patrice**: It catalyses the first step in an enzymatic reaction that can help you stabilise your wine colour.

*Charles*: I thought tannins do that when they are extracted in the second half of fermentation? I vaguely remember this from my Elsenburg days...

**Patrice**: Yes, true. Tannins can do that for you, but sometimes for specific wine styles you may not extract enough tannins, especially if you make new world style wines that are expected to be very soft and accessible quite young. Often, in such a case, you will press the wine off the skins while it has not fermented to complete dryness yet. So you miss out on those last tannins that could contribute to the colour stability of your wines.

*Charles*: Okay, exactly what does this Maxifruit do then?

**Patrice**: First of all it does all the normal stuff normal red wine enzymes do. It extracts colour and later during the fermentation, tannin. This extra side activity however, breaks a bond that releases hydroxycinnamic acid into the must.
**Charles**: And how does this enrich my life?

**Patrice**: In no way really. It is the wine yeast you use that completes the picture. It’s a synergy. The wine yeast contains a decarboxylase enzyme that can convert this hydroxycinnamic acid into a vinyl-phenol.

**Charles**: Hang on… this is starting to sound slightly suspect to me. Aren’t vinyl phenols off-flavours?

**Patrice**: Yes. That is why our white wine enzymes don’t contain cinnamyl esterases. You can smell vinyl phenols in white wines. It takes away varietal character and worst case scenario it smells medicinal. In red musts during fermentation however, they immediately bind to the free anthocyanins. When bound, they are odourless, and they are highly reactive, so they all bind. And, by binding to the anthocyanins, they form stable colour pigments. Fancy that!

**Charles**: Really? So what is bad for white is good for red?

**Patrice**: Correct. You do need a specific type of yeast though. So called: POF positive yeasts. Many red wine yeasts are POF positive. Just ask your supplier. We, of course, prefer you use our POF + yeasts, Fermicru XL and Fermicru VR 5, since they have other added benefits.

**Charles**: So you are telling me I have to stop using my current red wine enzyme and switch to Rapidase Maxifruit?

**Patrice**: No, that is not exactly what I’m saying. It depends on how you produce your wine, whether you extract enough tannin or not. It also depends on your choice of yeast. If you produce more classical style red wines that you age in barrels for longer than a year, chances are you will probably also ferment to dryness on the skins and maybe even do a little bit of extended skin contact post fermentation. Then you use Rapidase Ex-Color. When you produce a red wine for early release on the market where you maybe do not ferment to dryness on the skins, or if you just want to take out extra insurance in terms of colour stability, regardless of your winemaking practices, you use Rapidase Maxifruit in combination with POF positive yeasts. If you use any POF negative red wine yeasts (WE 372, NT 202, NT 50, NT 116, NT 112), you also use Rapidase Ex-Color since there is no advantage in using Maxifruit then.

**Charles**: But I don’t currently use Rapidase Ex-Color. I use a competitor enzyme.

**Patrice**: ‘Pas Possible!’ Now THAT needs to change!
The combination of the extensive knowledge of enzymatic reactions, grapes composition and winemaking processes, of DSM Food Specialities and Oenobrands, has led to the development of the RAPIDASE® range.

In our products, the main enzymatic activity is accompanied by secondary activities, some of which carry out an essential role. Any detrimental activity is naturally maintained at insignificant levels. The RAPIDASE® enzymes are presented here with the winemaker’s objective in mind.

OPTIMISE YOUR WINE SENSORY QUALITIES WITH RAPIDASE® GRANULATE ENZYMES

<table>
<thead>
<tr>
<th>Action</th>
<th>ROSÉ</th>
<th>EX COLOR</th>
<th>MAXIFRUIT</th>
<th>EXPRESSION</th>
<th>CB</th>
<th>GLUCALEES</th>
</tr>
</thead>
<tbody>
<tr>
<td>SETTLING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SETTLING OF DIFFICULT TO SETTLE JUICE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXTRACT VARIETAL CHARACTER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMPROVES YIELD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COLOUR EXTRACTION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COLOUR STABILISATION THROUGH TANNIN EXTRACTION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COLOUR STABILISATION THROUGH ENZYME - YEAST SYNERGY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGEING ON LEES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WINE FILTRATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BOOST YOUR WINEMAKING TECHNOLOGIES WITH RAPIDASE® LIQUID ENZYMES

<table>
<thead>
<tr>
<th>Action</th>
<th>VINO SUPER</th>
<th>X-PRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SETTLING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SETTLING OF DIFFICULT TO SETTLE JUICE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YIELD IMPROVEMENT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Application on grape

Application on grape must

Application on wine
Winemaking trials conducted by the IFV in France during 2010 on Merlot and Syrah delivered excellent results. Exotics SPH was compared with various commercial red wine yeasts and the following outstanding results were obtained:

- Lowest volatile acidity of all strains tested
- Partial degradation of malic acid
- Fastest malolactic fermentation
- Very high in ethyl esters - fruity aroma
- Very high in 2-phenyl-ethanol - floral, rose, honey aroma
- Very high in volatile thiols (Syrah)

The wines (in a blind tasting) showed the best complexity and most elegant aromas and the wines were described as very round and well balanced.

Hot off the press (2011) research results from the Institute for Wine Biotechnology confirmed up to 17 % malic acid breakdown in Pinot noir. It also confirmed pectinolytic activity under winemaking conditions when compared to normal S. cerevisiae, which has no activity. The exact effect of this activity needs to be established in future research. Preliminary results indicate an increase in free run yield after pressing. To our knowledge this is the first non-GMO wine yeast ever with pectinolytic activity.

In South Africa three producers have already been using Anchor Exotics SPH for the last two vintages on Pinotage, with great success. The yeast enhances a more traditional style (black fruits such as plums) as opposed to a red berry fruit (strawberries, raspberries and cherries) aroma and flavour.

It is therefore recommended for the production of icon and ultra-premium Pinotage, Shiraz and Merlot.
NEW PRODUCT: Fermicru Rosé


Fermicru Rosé is a new yeast from Oenobrands specifically selected for the production of new world style rosé. In South Africa two styles of rosé exists:

- Rosés produced mainly from Pinotage with the aroma and flavour profile of raspberries, strawberries and cherries
- Rosés produced from Cabernet Sauvignon, Merlot and Shiraz with an aroma and flavour profile of both red berries as well as the typical thiol varietal character of these cultivars.

Fermicru Rosé is very well suited for the production of the latter style of rosé, as in addition to producing red berry esters, it also enhances thiol varietal aromas. The yeast was extensively tested at the ‘Centre du rosé’ as well as various wineries in Europe in combination with Rapidase Rosé - hence the application suggestion of ‘Synergy Rosé.’

Fermicru Rosé is suitable for cold/cool fermentation (14°C minimum) and has a very high viability towards the end of fermentation ensuring a minimal adsorption of anthocyanin.

For the production of rosés from Cabernet Sauvignon, Merlot and Shiraz grapes with ‘explosive red berries and a twist of grapefruit aroma’ we recommend the synergistic combination of Rapidase Rosé and Fermicru Rosé.
Grape must contains equal amounts of glucose and fructose, but glucose ferments faster than fructose when using *Saccharomyces cerevisiae*, since this yeast genus is significantly glucophilic. During alcoholic fermentation, the ratio of fructose to glucose increases progressively, with fructose becoming the dominant sugar at later stages. The limited ability of most yeast strains to utilise fructose is a major cause of sluggish and then arrested fermentation, in particular when combined with nutritional imbalance in the must (Schutz and Gafner, 1993; Berthels *et al.*, 2004). Hence, the ability of wine yeast to ferment fructose is of critical importance to ensure must fermentation to dryness. Although variations have been claimed in the ability of *Saccharomyces* strains to ferment fructose, the molecular reasons for these differences have not been thoroughly investigated and the underlying mechanisms are not known.

The commercial wine yeast Fermichamp® (strain INRA 67J) is successfully used worldwide to restart stuck and sluggish fermentations. The reliability of this strain in restarting fermentation has been tested in comparison with other strains on the same application (Fernandez *et al.* 2005). Fermichamp displayed the greater capacity to ferment residual sugars. The strain has a very high ethanol tolerance (above 16 %) but this alone does not explain the results, hence the ability of the strain to ferment fructose was investigated.

Hexose transport is known to be an important step in sugar metabolism; it determines the rate of sugar utilisation by the yeast. *Saccharomyces cerevisiae* has 18 genes, which encode for hexose transporters, but only five of them were found to play a significant role in wine fermentation (Luyten *et al.*, 2002; Perez *et al.*, 2004). During fermentation, HXT3 is the most active hexose transporter. Genetic studies conducted on the gene encoding for the HXT3 hexose transporter of Fermichamp revealed that this gene contained several mutations when compared to the HXT3 genes of other yeasts. Further studies confirmed that Fermichamp’s enhanced ‘fructose utilisation phenotype’ is dependent on the expression of this mutated HXT3 gene, this mutation coding for a hexose transport protein with enhanced affinity for fructose. This study showed for the first time that the fructose utilisation pattern may depend on the nature of the hexose transporter present in a wine yeast cell wall.

In South Africa the best results in re-starting stuck fermentations are obtained with a 50:50 combination of Fermichamp and VIN 13 using the Anchor Yeast stuck fermentation protocol.

**Fermichamp**

## FERMICRU, COLLECTION CÉPAGE, FERMIVIN YEAST SELECTION TOOL - 2012

<table>
<thead>
<tr>
<th>GRAPE VARIETY</th>
<th>YEAST</th>
<th>WINE STYLE</th>
<th>FERMENTATION NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHENIN BLANC (barrel fermentation)</td>
<td>FERMICRU 4F9</td>
<td>Fruity and floral aromas, releases mannoproteins - rich and ripe style</td>
<td>Recommended for ageing on the lees</td>
</tr>
<tr>
<td>CHARDONNAY</td>
<td>FERMICRU LVCB</td>
<td>Fruity and mineral aromas</td>
<td>Fast fermentation speed in barrels</td>
</tr>
<tr>
<td>CHARDONNAY (barrel fermentation)</td>
<td>FERMICRU 4F9</td>
<td>Fruity and floral aromas, releases mannoproteins</td>
<td>Recommended for ageing on the lees</td>
</tr>
<tr>
<td>FERMICRU ROSÉ</td>
<td>FERMICRU ROSE</td>
<td>Enhances thiol and red fruit aromas in Cabernet Sauvignon, Merlot and Shiraz rosé</td>
<td>Can cold ferment (14°C)</td>
</tr>
<tr>
<td>CABERNET SAUVIGNON</td>
<td>FERMICRU XL</td>
<td>Popular premium style Cabernet - fruity red wines with enhanced mouthfeel and soft tannins</td>
<td>To be used with Rapidase Maxifruit for enhanced colour stabilisation</td>
</tr>
<tr>
<td></td>
<td>COLLECTION CÉPAGE CABERNET</td>
<td>Traditional style Cabernet - enhances blackcurrant, dark chocolate and fresh tobacco aromas</td>
<td>Complex yeast nutrient required Initial sugars must not exceed 25° B</td>
</tr>
<tr>
<td>MERLOT</td>
<td>FERMICRU XL</td>
<td>Popular premium style Merlot - fruity red wines with enhanced mouthfeel and soft tannins</td>
<td>To be used with Rapidase Maxifruit for enhanced colour stabilisation</td>
</tr>
<tr>
<td></td>
<td>COLLECTION CÉPAGE MERLOT</td>
<td>Wood maturated ‘Bordeaux’ style</td>
<td>Complex yeast nutrient required Initial sugars must not exceed 25° B</td>
</tr>
<tr>
<td>SHIRAZ</td>
<td>FERMICRU VRS</td>
<td>Enhances blackcurrant, cherry and spicy aromas</td>
<td>Complex yeast nutrient required Initial sugars must not exceed 25° B</td>
</tr>
<tr>
<td>PINOTAGE</td>
<td>FERMICRU XL</td>
<td>Fruity wine with enhanced mouthfeel and soft tannins</td>
<td>To be used with Rapidase Maxifruit for enhanced colour stabilisation</td>
</tr>
<tr>
<td>ALL CULTIVARS</td>
<td>FERMOHALP</td>
<td>Restarting stuck fermentations</td>
<td>Used in conjunction with Extraferm yeast hulls</td>
</tr>
</tbody>
</table>
2011 HARVEST FEEDBACK:
Anchor NT 202 - Co-Inoculant MLF starter culture


NT 202 - Co-Inoculant, Anchor’s first bacterial starter culture, was launched during the 2011 South African harvest season. This starter culture is a blend of *Oenococcus oeni* and *Lactobacillus plantarum* and it is the first of its kind in the world of winemaking. It is recommended for co-inoculation with NT 202 wine yeast. Thirty five wineries bought the product and used it on 80 tanks. Winemakers used the product as recommended with NT 202 wine yeast, as well as with their wine yeast of choice. 95% of winemakers who used the product indicated that they will use it again. Where the product was used within specifications there was a 97% success rate for malolactic fermentation. Where the product was used out of specifications, i.e. too high initial total SO₂ and alcohols exceeding 15.5%, lagging and stuck MLF’s were experienced. In quite a few cases where the product was used out of specifications the MLF still completed. It is imperative to note that a successful MLF is very dependent on a successful alcoholic fermentation as the two happen at the same time in this case. Lagging or stuck fermentations cause the struggling wine yeast to secrete toxic medium chain fatty acids, toxic not just to itself but also highly inhibitory to MLF bacteria. We had a few cases where a stuck alcoholic fermentation was the cause of a stuck MLF. This is one of the reasons why we recommend NT 202 for co-inoculation so as to ensure a successful alcoholic fermentation.

It took on average 14 days after alcoholic fermentation was completed, for MLF to complete. Some winemakers kept a control of the same wine with another culture or natural MLF. In most cases the NT 202 Co-Inoculant wines were preferred by the winemakers due to better mouthfeel, balance and integration of flavours. These organoleptic qualities are mostly attributed to the *Lactobacillus* component in the blend. NT 202 Co-Inoculant was also sold in France, Italy and Spain during their 2011 harvest.

*Anchor NT 202 Co-Inoculant was developed by the Institute for Wine Biotechnology, Stellenbosch University. The bacteria in the blend are South African isolates.*
Natuferm - a new multi-tool

Natuferm is a completely natural yeast nutrient, rich in organic nitrogen and trace elements. It is specific to the initial phases of alcoholic fermentation. Its high concentration in trace elements and available amino nitrogen promotes a healthy yeast population. With appropriate fermentation conditions (turbidity and temperature), Natuferm increases the production of aromatic fermentation esters. Natuferm is a precise fermentation tool allowing a tailored response to the objectives of each wine and vintage requirements. With Natuferm winemakers can add organic nitrogen in the form of free amino acids and peptides (protein building blocks) at the beginning of fermentation and then add ammonium salts or complex yeast nutrients two to three days later as needed.

Due to its specific way of production, Natuferm is very easily dispersible in water or must. This unique property makes its usage extremely simple. Its composition promotes fermentation effectiveness and actively contributes to obtaining wines with excellent aromatic and analytical quality.

Although Natuferm is rich in free amino acids, it is naturally low in amino acid precursors of biogenic amines (histidine, tryptophane and tyrosine). To facilitate the fermenting yeast’s assimilation of the amino acids provided by Natuferm, avoid simultaneous addition of ammonium salts such as DAP. For complete consumption of Natuferm amino acids, its addition should only take place during the first third of alcoholic fermentation.
**Wine Yeast Nutrients 101**

There is currently a very wide variety of wine yeast nutrients available under many different brand names. The choice presented to winemakers is staggering and overwhelming and can be quite confusing. These ‘nutrients’ are classified as complex yeast nutrients, yeast hulls, rehydration nutrients, rehydration protectants, inactivated yeast-based products to enhance mouth-feel, glutathione enriched nutrients, aroma enhancing nutrients, vitamin mixes, mannoproteins, etc. What are the differences amongst these nutrients and when does one use what? The following article addresses these questions and will hopefully provide you, as winemaker, with more clarity on this issue. It will also hopefully provide you with ammunition to distinguish between a salesperson looking to make a quick buck by driving the fear of the apocalypse into you if you don’t use complex yeast nutrients, and an honest, qualified technical consultant giving you the best advice for your specific fermentation conditions.

With the exception of pure vitamin mixes, all of the above mentioned nutrients contain inactivated yeasts (dead yeasts), or parts of dead yeasts, as a very important ingredient in the mix. The reason for this is that live yeast cells are little cannibals and will feed on dead yeast cells as a source of nutrients. So, what is in a dead yeast cell that a live one would want? First we have to look at the basic morphology of yeast.

![The Yeast Cell](image)

The yeast is an organism consisting of one cell only. This one cell is surrounded by a cell wall, followed by a space called the periplasmic space, a cell membrane and the cytoplasm, or the inside of the yeast. In the inside of the yeast there are many important organelles, of which the vacuole is the most mentioned in winemaking. The cell wall consists of mainly
mannoproteins and glucans and is responsible for giving form to the yeast cell and providing a physical protection barrier for the inside of the cell. The cell wall is linked to the cell membrane across the space by glucan and chitin chains. The space contain various enzymes responsible for regulating yeast metabolism, one of them being invertase, which is responsible for hydrolysing sucrose to glucose and fructose.

The cell membrane is the policeman who regulates what comes into and what goes out of the yeast cell. It consists mainly of sterols and lipids. These sterols and lipids are responsible for membrane integrity. Proper membrane integrity ensures yeast survival under fermentation conditions as well as proper uptake of sugars and amino acids. Various factors, such as incorrect rehydration, winery propagation (mother tanking), high sugar stress and increasing alcohol levels, to name a few, can compromise membrane integrity.

Most of the breakdown from glucose to fructose to ethanol happens in the cytoplasm. Once ethanol is formed, it is secreted into the medium. The yeast also secretes various other by-products of fermentation such as glycerol, acetic acid, H₂S and esters into the medium. The vacuole is important because it stores various enzymes and amino acids needed for protein synthesis in yeast metabolism. Protein synthesis is important to provide enzymes for sugar uptake, sugar breakdown and yeast biomass formation.

So, why this very basic lesson in yeast morphology? Well, because complex yeast nutrition is based on what either the cell walls, or the cell membranes, or the cell insides (called yeast extract), or the combination of all of the above, can do to enhance the fermentation performance of live yeast cells. There are basically five different inactivated yeast-based products on the market:

1. **Inactivated yeast** - the whole yeast cell has been killed by heat. It contains the cell wall, the cell membrane and the whole inside of the yeast. Inactivated yeasts are still
intact and cannot be distinguished from live yeast cells under a microscope unless they are stained with a colour stain. Dead yeast cells absorb colour and live ones don’t.

2. **Yeast autolysate** - the whole yeast cell is killed and then exposed to lytic enzymes at 45°C for a certain time period. The result is that the cell wall, that contains glucans, is partially degraded and the cell membrane and the ‘soluble inside’ of the yeast are more exposed, and therefore more available, to the hungry cannibals lurking around for a bite.

3. **Yeast hulls / ghosts** - this is the insoluble yeast cell wall fraction of yeast autolysate after centrifugation. Depending on the washing process used during the manufacturing of yeast hulls, they may or may not contain parts of the cell membrane.

4. **Yeast extract** - the supernatant of yeast autolysate or in plain English: the soluble insides of yeast cells once the insoluble cell walls and cell membranes have been removed.

5. **Specific yeast fractions** - e.g. mannoproteins. Mannoproteins are a specific cell wall constituent and production thereof requires further processing of yeast cell walls.

For the production of these products a critical yeast biomass production is needed during which various enrichment procedures can be performed. Examples of such procedures include vitamin, mineral and glutathione enrichments.

**What are the different types of commercial products?**

(As Anchor Yeast does not have first hand knowledge of the production processes of competitor products, the following information is based on what is provided on product specification leaflets or can be merely speculation based on the description of how the product works.)

1. **Complex yeast nutrients** mainly consist of inactivated yeast and ammonium salts such as DAP and ammonium sulphate (not permitted in all countries). Although inactivated yeast can be a good source of vitamins and minerals, some suppliers supplement their nutrients with added vitamins (usually thiamine) and minerals (usually magnesium sulphate - not permitted in all countries). Complex yeast nutrients can also contain yeast extract, although this is rare. The reason being that yeast extract is very strong in flavour (Marmite is pure yeast extract) and unless the supplier has a source of odourless yeast extract, it can impart a negative aroma to the wine. It is, however, a very good source of nutrients for the fermenting yeast since it contains a high concentration of organic nitrogen (amino acids).
2. **Rehydration nutrients** - these nutrients contain no ammonium salts. They are mainly inactivated yeasts that are supplemented with either extra minerals or vitamins or both. Although inactivated yeasts are intact yeast cells, their cell membranes (which regulate flow of molecules in and out of the cells) are badly damaged through the inactivation process. Small molecules such as vitamins, minerals, amino acids and nucleic acids can ‘leak out’ of the cells and have an impact not only on the fermentation efficiency, but also on the aroma and flavour production of the fermenting yeasts. Rehydration nutrients are therefore not only sold as a nutrient source, but also as possible aroma enhancement tools. The effect of a rehydration nutrient on volatile thiols in Sauvignon blanc has been demonstrated.

3. **Rehydration protectant** - only one company has the patent to produce and sell such a product. A rehydration protectant is a partially autolysed inactivated yeast. The partial autolysation exposes the sterols in the cell membrane so that they become more readily available to be incorporated into the cell membranes of the fermenting yeast. The purpose of a rehydration protectant is therefore to enhance alcohol tolerance.

4. **Yeast nutrients for organic wine production** - these should be (we cannot confirm whether manufacturers do this) partially autolysed inactivated yeasts. The idea is to allow the fermenting yeasts access to the ‘insides’ of the dead yeast cells for a source of organic nitrogen (amino acids), since the addition of inorganic nitrogen during the production of organic wine is not permitted.

5. **Yeast hulls** - cell walls can have very good absorption capacities, depending on how they were produced. Their main role during fermentation is to bind to toxic medium chain fatty acids secreted by the fermenting yeasts, thereby detoxifying the environment and allowing the fermenting yeast to ferment to dryness. If yeast cell walls contain parts of the cell membrane they can also be a source of sterols and lipids. Theoretically yeast cell walls are therefore not ‘nutrients’. Care should be taken when using cell wall based products because the exposed lipids can oxidise and give off odours to the wine., Make sure the product is fresh and within the expiry date. Suppliers must use special packaging. Do not exceed the maximum recommended dosage.

6. **Inactivated yeast based products recommended for white wine longevity** - theoretically this type of product is not sold as a nutrient but rather as a source of glutathione. It, is normally recommended for white wines made from grape varieties that contain volatile thiols. Glutathione is also a thiol that has anti-oxidative capacities. This product is normally inactivated yeast that was glutathione enriched during its production process.
7. Yeast derived mouth feel enhancing products - various commercial products are recommended for this purpose. They are usually specific yeast fractions (such as mannoproteins) that have mouth feel enhancing capabilities. These products also do not serve the purpose of a ‘yeast nutrient.’

When to use what?

Complex yeast nutrients:

- Certain yeast strains always benefit from the use of a complex yeast nutrient regardless of the conditions of the must. They are genetically just not strong enough to perform optimally under normal winemaking conditions.

- Low YAN musts require the use of complex yeast nutrients since a low YAN is usually also an indication of low vitamin and mineral content. Research done by the Institute for Wine Biotechnology at the University of Stellenbosch proved that stuck fermentations could occur if a medium is mineral or vitamin deficient. The medium that was supplemented with complex yeast nutrients fermented to dryness and the DAP supplemented medium got stuck. A vitamin shortage can also lead to a sluggish ferment and / or the production of sulphur-like off odours.

Rehydration nutrients

- Yeast strains differ from each other in terms of nutrient demands. The nutrient demand of a particular strain is not necessarily linked to the alcohol tolerance of that particular strain. When the YAN of the juice is very low (below 100 mg/L) the use of a rehydration nutrient is recommended for some strains. Complex yeast nutrients are normally added after the onset of fermentation because they contain ammonium salts. So the various components of complex yeast nutrients such as amino acids, vitamins, minerals, sterols and lipids are not available from the start of fermentation. A rehydration nutrient will provide these components from the start and also only provide them to the yeast that will be conducting the fermentation. In every must there is a certain percentage of wild yeast and bacteria that will also happily eat the nutrients provided. So, some yeast strains are fine with complex yeast nutrients added after the onset of fermentation and others benefit more from the early addition of a rehydration nutrient. In most cases it is not necessary to use both types of products in one fermentation. However, certain stressful must conditions combined with certain yeasts, will require the use of both. In some cases it could be more economical to simply switch to a more robust yeast with a lower nutrient demand than to use a massive amount of nutrients to pull the fermentation through.
Certain rehydration nutrients can also have a positive effect on the production of volatile thiols, so it might be beneficial to use such products in the production of Sauvignon blanc, Colombard and Chenin blanc.

**Rehydration protectants**

- The role of a rehydration protectant is to provide sterols and lipids to the live yeast cells. It is used during rehydration so that the sterols and lipids are only available to the inoculated yeast and not the wild yeasts present in the must. A rehydration protectant is used for certain yeast strains under stressful must conditions such as low fermentation temperatures (13°C or below), high fermentation temperatures (28°C and above - which is not recommended, but practised by many winemakers nonetheless 😞) and high sugar musts (for some yeast strains above 24°Balling and for others above 25 or 26°Balling). A rehydration protectant can also be a nutrient source in providing vitamins and minerals to the fermenting yeast.

**Pure vitamin mixes**

- The use of pure vitamin mixes is not permitted in all countries. These mixes normally contain the most important vitamins needed during fermentation. Research at the Institute for Wine Biotechnology at the University of Stellenbosch showed that inactivated yeast based products can be as effective, if not more effective, than pure vitamin mixes to prevent stuck fermentations. The addition of vitamins to a fermenting must is recommended for very low, as well as very high, YAN musts. In very high YAN musts the ratio of pantothenate (a vitamin involved in the production of sulphur containing amino acids) to YAN can be distorted and, as a result, sulphur-like off odours can form, even if there is enough nitrogen present.

**Yeast hulls (cell walls)**

- Currently yeast hulls are mostly used for sluggish or stuck fermentations. Their main role is to detoxify the must from medium chain fatty acids that are secreted by the struggling yeast. They are toxic to the very yeast from which they originated. Due to the production process of yeast hulls, it is an expensive product compared to other types of nutrients, so winemakers tend to use it only when they already have a problem. However, a smaller dosage can be used as a preventative measure for some yeast strains or must conditions, for instance during the fermentation of a yeast with a low nutrient demand and / or a high YAN must. In such a case the use of a complex yeast nutrient may not be necessary, however, extreme fermentation temperatures, pesticide residues or high alcohols might cause the fermenting yeast to stress and produce medium chain fatty acids.
Medium chain fatty acids are also inhibitory to malolactic bacteria and can delay or inhibit MLF. Certain grape varieties such as Merlot are more prone to MLF problems. Certain wine conditions such as high alcohol and low temperatures are also more conducive to MLF problems. It is therefore wise to ensure the best possible conditions for MLF, since in most cases; problems arise due to the cumulative effect of various factors instead of just one factor. By adding yeast hulls during fermentation, one therefore ensures a better environment for the yeast as well as the bacteria during the subsequent MLF.

Yeast hulls can also be used after fermentation on finished wines to remove cork-like taints such as anisoles. Anisoles can be derived from corks, wood treatment products and chlorinated sanitation chemicals used in wineries. They impart a mouldy smell to wines.

**Glutathione enriched inactivated yeast**

These types of products are added at the start of fermentation and are used to enhance the longevity of volatile thiol containing white wines. Most white grape varieties contain some percentage of volatile thiols. Glutathione itself is a grape derived thiol and is present in grape juice. It is highly oxidisable so it is advisable, in addition to the use of certain winemaking practices, to add additional glutathione to the must in order to ensure adequate levels in the must. The addition of pure glutathione to grape must is not allowed (an application with the OIV is in progress), but the addition of glutathione enriched inactivated yeast is. Research showed that wines from musts that had glutathione added during fermentation three years previously had an increased volatile thiol content, better colour and lower concentrations of the compounds associated with atypical aging. So, for white wines destined for ageing longer than 12 or 18 months, a product like this can be beneficial.

**Mannoproteins**

Mannoproteins can have two important roles in winemaking. They can enhance mouth feel and, more importantly, contribute toward improving tartrate stability. They are sold as a pure product or as part of cell wall fractions. Specific cell wall fractions further enhance mouth feel through the polysaccharide (mostly glucans) content of cell walls.

The bottom line regarding these types of products is that it is not a clear-cut science of what to use and where. The yeast strain and the specific conditions of the must will greatly determine which product to use. As a winemaker it is wise to familiarise yourself with the differences amongst the different products in order to be able to determine which one will be most appropriate for your needs. The supplier must be able to make a recommendation. In some
cases the solution to your specific needs might be as simple as switching to another yeast strain to conduct the fermentation. The economics of the whole exercise must be taken into account as well.

**Oenobrands nutrients classification:**

- **Nutrivin, Nutrivin Super and Maxaferm** (currently not available in RSA) - complex yeast nutrients for yeast nutrition
- **Anchorferm** - whole inactivated yeasts for yeast nutrition
- **Extraferm** - yeast hulls for must and wine detoxification
- **Natuferm** - partially autolysed inactivated yeasts for yeast nutrition and wine aroma enhancement
- **Claristar** - mannoproteins for tartrate stability

References:

*Anchor Yeast nutrient project progress report. The Institute for Wine Biotechnology, Stellenbosch University. 2008.*
*Bowyer, P., Gourraud, C., Murat, M-L. and Van der Westhuizen, T. Modulation of Sauvignon blanc aromas through yeast strain, nutrition and seasonal variation. November 2008.*
Ordering and payment details

Orders can be e-mailed, faxed or placed telephonically with either Kathy or Sebastiaan.

If technical assistance is needed to help make a decision before placing an order, a Technical Consultant will gladly assist you with your order.

Please use the Anchor order forms as provided.

Order numbers or name of person placing the order are compulsory.

For initial orders, please indicate a week during which we can deliver. We cannot deliver all orders on a Monday, as this is the most popular day for deliveries and the delivery trucks are very quickly fully booked for Mondays.

We do not guarantee a 24-hour delivery although we will do our very best to ensure speedy delivery of your order.

No COD orders will be delivered without payment on delivery or payment by Internet banking before delivery.

Deliveries to Malmesbury, Riebeek Kasteel, Riebeek West and Porterville are every Tuesday via the Anchor Yeast Bakery truck.

Anchor Yeast payment terms are strictly 30 days from statement. January’s purchases must be paid in full by the end of February or accounts will automatically go on hold on 1 March.

If you don’t already have an account with Anchor, please apply before harvest since we require adequate time to do a proper credit check, as per the Credit Act.

Anchor Yeast does not take any unused product back after the season. The products all have adequate shelf lives and can be used the next year if stored correctly.

All certificates such as non-GMO, MSDS, Allergen and COA’s are available on:

Banking details

Full name of account: RYMCO (PTY) LTD T/A ANCHOR YEAST

Bank: Nedbank
Branch: Industria
Branch code: 196-305
Account type: Current
Account no: 196-328-3910

Reference: If you are an account holder, please indicate your account number, starting with SA, on your invoice or statement.

If you are a COD client, please use the invoice number. DO NOT use your company name or your personal name.

Please note: Our payment terms for account holders are strictly 30 days from statement. Late payment will result in the account being placed on hold and ultimately closed. Please ensure that your financial department has this information.