ALCOHOLIC FERMENTATION OPTIMISERS

Protection, Nutrition & Revelation

IOC

Révélons votre différence

SUCCESSFUL ALCOHOLIC FERMENTATION: THE CHALLENGES OF GRAPE MUST

As the most important nutrient for yeasts, nitrogen is a key factor since it has a high impact on the fermentation of wine. This nutrient impacts fermentation kinetics and is important in the quality of wine produced.

Generally speaking, nitrogen deficiencies in wine limit yeast growth and the rate of fermentation.

Where nitrogen is concerned, it is quality rather than quantity that is important. The assimilable type of nitrogen (organic or ammoniacal) and the moment when it is added play a major role, at both sensory level (sulphurous odours, bringing out fruity, thiol aromas etc.) and technical level (rate of fermentation, rise in temperature, capacity to facilitate or not malolactic fermentation).

In addition, the function of micronutrients in the physiology of yeast and fermentation performances has been underestimated for a number of years. Minerals such as magnesium, zinc and potassium are absolutely essential for the multiplication and metabolism of yeasts.

Similarly, vitamins are organic compounds essential in helping yeast survive stress conditions. Vitamin deficiency can lead to sudden changes in fermentation kinetics, but also lead to problems such as sulphurous odour or compounds combining SO_2.

Finally, simply controlling yeast growth is not enough. Protecting yeasts by providing sterols and polyunsaturated fatty acids enhances their chances of survival, while optimising their organoleptic impact. From the rehydration phase to the end of fermentation, the protected yeast maintains a high level of viability. Its membrane is able to resist high alcohol concentrations and prevents alcohol from entering the cells. This protection ensures that the yeast finishes the process of taking up all sugars present in the must. Beyond just providing safety during the fermentation process, thorough optimisation of the membrane brings out aromas much better.

IOC proposes a dedicated range for meeting these needs, tailored to the different conditions encountered in musts.

A RANGE OF DEDICATED BIOTECHNOLOGIES TO OPTIMISE ALCOHOLIC FERMENTATION (AF)

YEAST PROTECTORS : TO OPTIMISE ALCOHOLIC FERMENTATION (AF)

ACTIPROTECT+
2nd generation yeast protector, rich in dedicated sterols and survival factors, for clarified musts and/or those rich in sugar.

ACTIPROTECT ROSÉ
3rd generation yeast protector, for bringing out the aromas of rosé wines. Optimises assimilation of aroma precursors through the yeast membrane.

DETOXIFICANTS : BEFORE AF, AT 2/3 AF OR FOR RESTARTING A STUCK AF

ACTICLEAN
Detoxifying and cellulose-supporting inactive yeasts, to prevent or reduce stuck fermentations and stoppages.

CELLCLEAN
Yeast cell wall fragments with high detoxifying power to restart stuck alcoholic fermentations.

NUTRIENTS : AT THE BEGINNING AND/OR 1/3 AF

ACTIVIT O
A high-quality, complete nutrient rich in thiamine and 100% amino nitrogen for top-quality fermentation, bringing out aromas and purity, while limiting combination of SO_2.

ACTIVIT NAT
Source of nitrogen from 100% yeast and micronutrients (without added thiamine), to help elimination of sulphurous odours, facilitate malolactic fermentation and bringing out aromas.

ACTIVIT
Complex mixed nutrient rich in assimilable nitrogen, vitamins and minerals, to ensure regular development of yeasts in high levels of deficiency. Does not contain ammonium sulphate.

VITISTART
Complex nitrogen nutrient and support for yeasts, particularly well-suited to conditions in white and rosé musts (low temperature and/or turbidity).

Go to www.ioc.eu.com and discover our dedicated decision-making tool :
which proposes and automatically calculates optimised protocols, suitable to your requirements, product-objectives and choice of yeast.

OPTIMISATION OF ALCOHOLIC FERMENTATION: THE PRACTICAL APPROACH

↘ EVALUATING THE ENVIRONMENT

AGGRESIVITY OF THE JUICE

BASIC CONDITIONS		0
Vinification without oxygen		+ 1
Potential alcohol content	> 13,5 % vol.	+ 1
	> 14,5 % vol.	+ 2
Must turbidity < 80 NTU		+ 1
Temperature < 15°C or > 28°C		+ 1
pH < 3,2		+ 1
AF previously difficult		+ 2
0 / 1 / 2 / 3 et +		← TOTAL

NITROGEN DEFICIENCIES FOR A YEAST WITH MODERATE NEEDS*

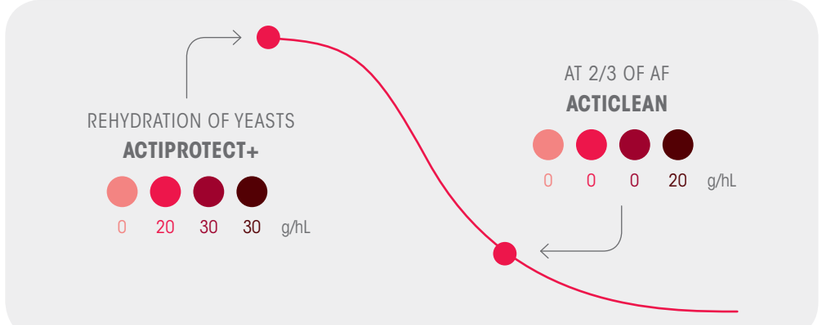
POTENTIAL ALCOHOL CONTENT				
YAN	< 12,5 % vol.	from 12,5 to 13,5 % vol.	from 13,5 to 14,5 % vol.	> 14,5 % vol.
> 200 mg/L	No nitrogen deficiency		Low deficiency	Moderate deficiency
from 150 to 200 mg/L	No nitrogen deficiency	Low deficiency	Moderate deficiency	High deficiency
from 120 to 150 mg/L	Low deficiency	Moderate deficiency	High deficiency	Extreme deficiency
from 90 to 120 mg/L	High deficiency	High deficiency	Extreme deficiency	Extreme deficiency
< 90 mg/L	Extreme deficiency	Extreme deficiency	Maximum deficiency	Maximum deficiency

* For a yeast with low requirements, reduce deficiency by one level ; for a yeast with high requirements, increase by one level.

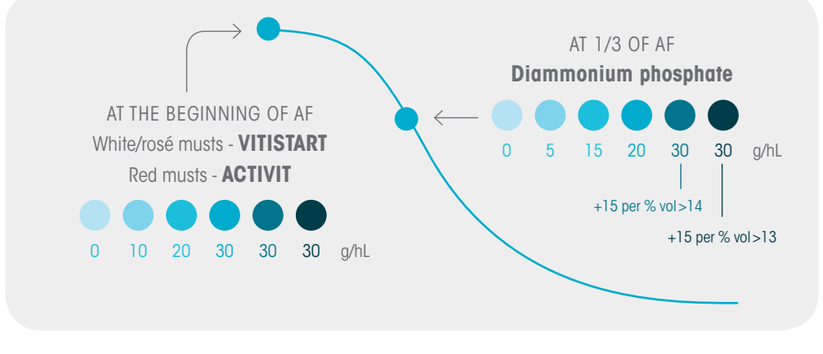
↘ FERMENTATION STRATEGIES LINKED TO PRODUCT-OBJECTIVES

FERMENTATION SAFETY

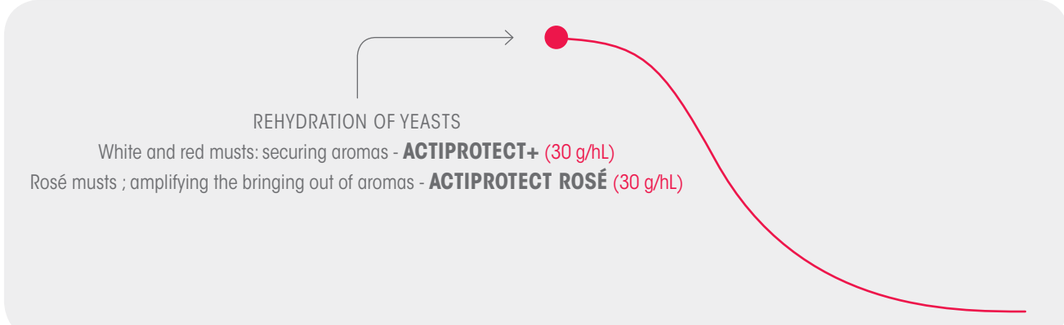
PROTECTION OF YEASTS AND DETOXIFICATION OF MUST

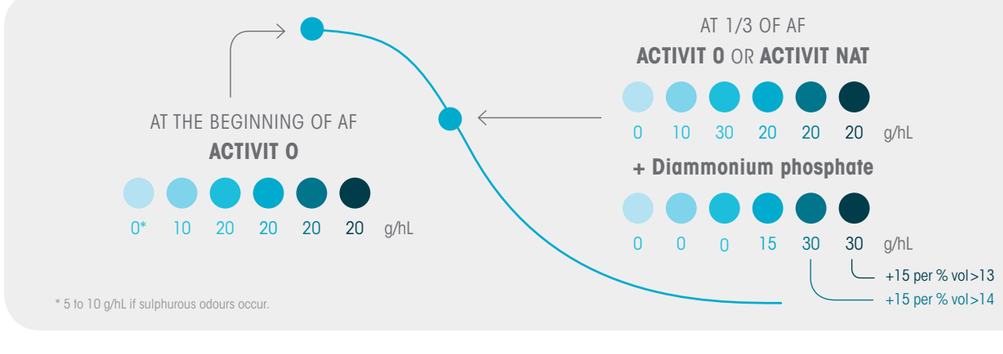


YEAST NUTRITION



OPTIMISATION AND EVALUATION OF AROMAS





OPTIMISATION OF ALCOHOLIC FERMENTATION - 3 AXIS OF ACTION

YEAST PROTECTION: CHALLENGING AN AGGRESSIVE JUICE... AND MUCH MORE!

PRINCIPLE

- Yeasts protect themselves against the aggressiveness of the juice (acidity, alcohol, sugars…) via membranes.
- The membrane also ensures that aromatic precursors enter the yeast to be transformed into aromas.
- This membrane is fragile in certain situations (low or high temperatures, very clarified musts, vinification in reducing environments).
- Sterols guarantee good membrane constitution.

ACTION

- Yeast protectors provide rehydrated yeasts with the sterols required to survive and bring out aromas.

SPECIFIC FEATURES OF OUR PROTECTANTS

- Selected yeasts, produced and autolysed in such a way as to be very rich (2nd generation protectors) or extremely rich (3rd generation) in sterols.

YEAST NUTRITION: GROWTH, ACTIVATION... WITHOUT INHIBITING AROMAS!

PRINCIPLE

- Up to one third of AF, yeasts use nitrogen to multiply; then to activate alcohol fermentation.
- Nitrogen deficiency or yeast surplus may cause sulphurous odours.
- Ammoniacal nitrogen in excess (in particular at the beginning of AF) may cause an excess, but it may also inhibit the entry of aroma precursors in the yeast, since it is assimilated in priority before precursors.
- Yeast also needs minerals and vitamins to avoid producing undesirable compounds.

ACTION

- Complex nutrients and, even more so, nutrients that are of 100% yeast origin provide yeast with high quantities of amino nitrogen which are assimilated more regularly and which do not inhibit bringing out aromas.
- Complex and organic nutrients are also essential sources of minerals and vitamins.

SPECIFIC FEATURES OF OUR NUTRIENTS

- Selected yeasts, produced and autolysed in such a way as to be extremely concentrated in assimilable amino acids and above all are bioavailable.

DETOXIFICATION OF MUST: STARTING WITH A CLEAN SHEET

PRINCIPLE

- In a stress situation, caused by aggressiveness of the juice, yeast produces toxins (short- or medium-chain fatty acids) which inhibit fermentation.
- Liberation occurs shortly after two thirds of the fermentation.

ACTION

- Cellulose added to the must reduces yeast stress.
- Yeast cell walls can trap toxins and thereby clean up the juice, either to continue with AF unhindered or re-activate a fermentation that had stopped.

SPECIAL FEATURES OF OUR DETOXIFICANTS

- Balanced dosage between a support effect (stress prevention) and adsorption capacity of inhibitory fatty acids and pesticides (cleaning the must), depending on the application.

FAQs

«Does nitrogen richness need to be known before inoculation?»

To adapt a sustainable and efficient nutrient strategy, it is effectively better to dose the YAN. On the one hand, this makes it possible to avoid stuck fermentations due to deficiencies and, on the other, overdose of nitrogen which would jeopardise the survival of the yeast, the malolactic fermentation and the sensory quality of wines (sulphurous odours).

«Why do you recommend two inputs of nitrogen?»

Generally speaking, it is more efficient to provide nitrogen input after the growth phase, at one third of AF. Often, however, people prefer to divide this input between one third and the beginning of AF for the following reasons:

- to avoid a peak of yeast activity and temperature at the third of AF, due to too much added nitrogen;
- to provide nutrients that are of 100% yeast origin or complex at the beginning of AF to feed the yeast in the vitamins (especially thiamine) and minerals it needs at that time;
- to increase aromatic syntheses through amino nitrogen provided at the beginning of AF.

In all cases, you must avoid adding ammoniacal nitrogen on its own at the beginning of AF.

«Do indigenous yeasts have the same needs in nutrients as selected yeasts?»

Yeasts do not all have the same needs in nitrogen. IOC has characterised the nitrogen needs of each of its speciality yeasts, making it possible to sustain nutrient contributions. An indigenous yeast can have very variable, unknown needs, which are difficult to assess. Unforeseeable variability is regularly responsible for stuck AF or sensory deviations, as the winemaker cannot choose the suitable nutrient.

«Why not just use nitrogen in the form of ammonium salts?»

A nutrient made up of just ammoniacal nitrogen and thiamine is liable to create yeast overpopulation, jeopardising not just the physiological status of each yeast, but also possibly causing induced deficiency in nitrogen. Complex nutrients ACTIVIT and VITISTART are made up of a balanced ratio of ammoniacal nitrogen and amino nitrogen.

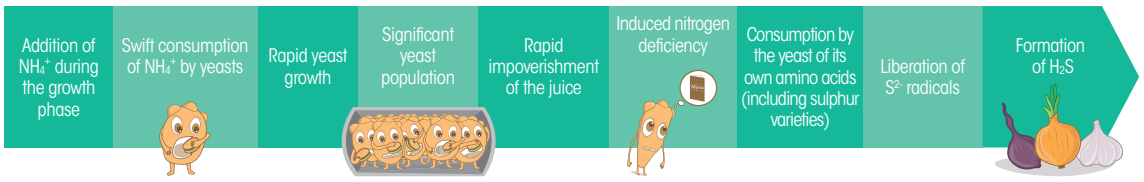
They also contain micronutrients (vitamins and minerals). All these elements make it possible to avoid nutritional imbalance which could lead to kinetic and sensory difficulties. 100% organic-based nutrients ACTIVIT O and ACTIVIT NAT go even further in regulating growth and yeast metabolism, in particular by strongly limiting the production of sulphurous odours. Moreover, these enhance the bringing out of aromas, in particular of varietal thiols, whereas excessive ammonium could inhibit such.

«What form of ammoniacal nitrogen - phosphate or sulphate salt?»

Some yeasts -but not all- would have increased SO_2 production if ammonium sulphate were added.

For this reason, we would tend to recommend diammonium phosphate if an addition of ammoniacal nitrogen is necessary.

Impact of an addition of ammoniacal nitrogen (NH_4^+) during the yeast growth phase



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