



Accelerating, releasing &
bringing out the difference!





IOC's MYZYM™ range is the answer to the wine-maker's desire for tailored solutions to needs.

Based on a study on the expectations of users of œnological enzymes and our vast vineyard experience, we have created the MYZYM™ range, basing ourselves on criteria of **quality, efficiency and reliability**.

To begin with, IOC analysed and tested a set of raw materials and market formulations before going on to make a rigorous

selection of the most efficient materials in line with market economic realities.

Attentive to facilitating implementation of our enzymes, we propose micro-granulated formulations, thereby limiting powderiness, or ready-to-use liquid formulations.

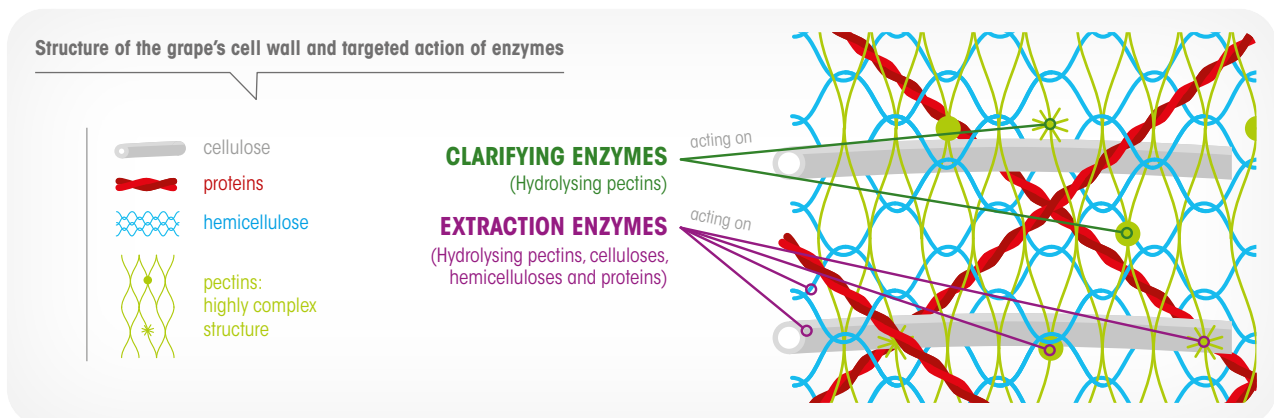
MYZYM™ is a complete range offering bespoke solutions, for each application and for all conditions, tested and approved by the wine sector.

MYZYM™ : WHY?

Enzymes are natural proteins that accelerate biochemical reactions in living organisms. Œnological enzymes will therefore help you **accelerate and amplify the various stages of vinification** providing you with:

- **Quantitative gains:** gain in time, increase in the volume of juice and enhanced filterability.
- **Qualitative gains:** release of aromas, enhanced colour and structure.

What is important is to choose the enzyme whose action on grapes will be best tailored to achieving the sought-after result.



MYZYM™ : HOW?

In order to guarantee œnological enzyme efficiency, a watch needs to be kept on certain parameters.

TEMPERATURE: if too low, enzymes are slowed down, if too high, they are destroyed. The optimum temperature for using enzymes is far from the standard vinification zone. If you want to use enzymes at more extreme temperatures, you will need to choose the one that is most suitable for these specific conditions, increase the time of action and dosages.

BENTONITE: enzymes are inactivated by bentonite. They must therefore be used before adding bentonite, or once this product is totally eliminated.

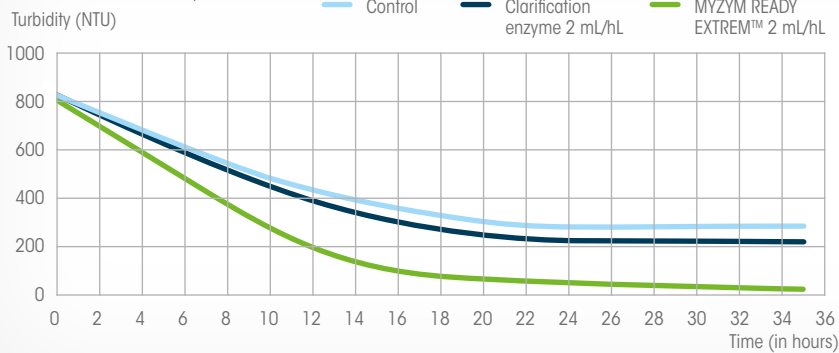
IMPLEMENTATION: we propose perfectly soluble enzyme formulations in micro-granulated form, or in liquid form, for best ease-of-use. In order to optimise dispersal in the must or wine, you will first of all need to dissolve and dilute them in ten times their weight of cold water.

MYZYM™: RESULTS

EXAMPLE OF CLARIFICATION PERFORMANCES IN EXTREME CONDITIONS:

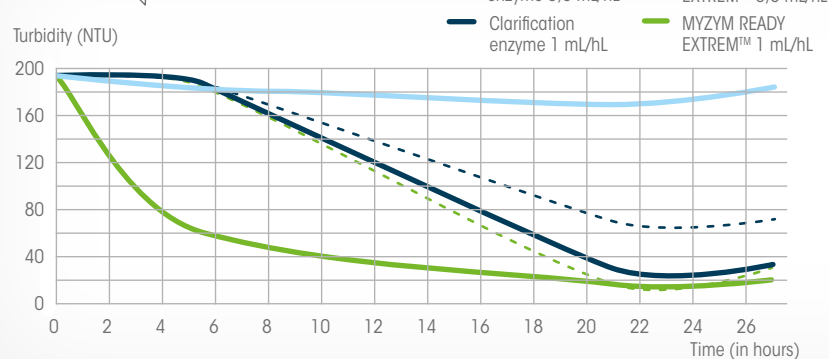
MYZYM READY EXTREM™ is an enzyme formulation selected to resist extreme temperatures and remain highly active in difficult conditions.

Clarification kinetics at 4°C



In this example of clarification of a white must at very low temperature (4°C, pH 3.6), MYZYM READY EXTREM™ emerged as the most suitable enzyme formulation to bring about a swift and quality clarification (low final turbidity of must).

Clarification kinetics at 45°C

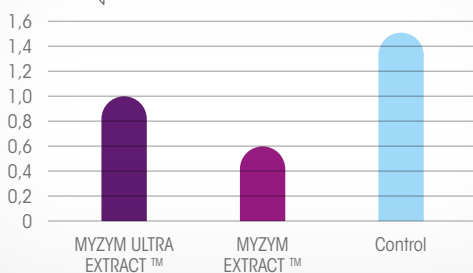


In this example of clarification of a red must at pH 3.4 (Merlot), after thermovinification, the specific thermostability of MYZYM READY EXTREM™ makes it particularly active: here, at half dosage, it is as efficient as a conventional formulation, and clearly more so at equivalent dosage.

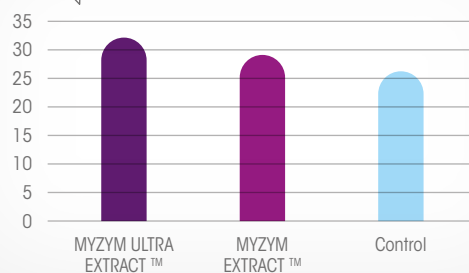
OPTIMISING EXTRACTION:

Test on grapes: Grape variety=Merlot, juice pH=3.40, juice temperature=16.5°C, contact time=24hrs, dosage=1 mL/hL for each modality.

Sediment estimation %



Juice vol. (in mL)



Using MYZYM EXTRACT™ and even more so MYZYM ULTRA EXTRACT™ helps increase the volume of juice/wine extraction in maceration, but also of interesting compounds such as pigments and polysaccharides providing richness as a result of their hemicellulase activities which act in synergy with pectin activities.

MYZYM™: THE RANGE

MYZYM CLARIF™

Clarification of musts

MYZYM ULTRA CLARIF™

Clarification of musts
in difficult conditions

MYZYM READY CLARIFICATION™

Liquid formulation for clarification
of musts in difficult conditions

MYZYM CLEAR™

Clarification of musts and botrytised
wines, enhanced filterability

MYZYM READY EXTREM™

Liquid formulation for clarification
in extreme conditions (cold,
hot, highly-loaded juices)

MYZYM READY'UP™

Liquid formulation dedicated
for clarification in flotation

MYZYM READY SPIRIT™

Liquid formulation for the pressing
and clarification of musts used in
distillation products (low PME)

MYZYM READY PRESS™

Liquid formulation for pressing
the harvests used in the process
of making white and rosé wines

MYZYM MPF™

Extraction of colour and aromatic
precursors in cold maceration

MYZYM EXTRACT™

Extraction of colour and
enhanced structure

MYZYM ULTRA EXTRACT™

Extraction of colour and enhanced
structure in difficult conditions

MYZYM RED FRUITS™

Extraction and bringing out aromatic
precursors of red grapes

MYZYM WHITE FRUITS™

Extraction and bringing out aromatic
precursors of white grapes

MYZYM ÉLEVAGE™

Heightens richness and aromas by
accelerated autolysis of yeasts

MYZYM AROMA™

Brings out varietal aromas
from precursors

MYZYM™ : WHICH ONE?

PRE-FERMENTATION OPERATIONS – CLARIFICATION

		MYZYM Clarif™	MYZYM Ultra Clarif™	MYZYM Ready Clarification™	MYZYM Clear™	MYZYM Ready Extrem™	MYZYM Ready'Up™	MYZYM Ready Spirit™
Wine colour		●●●	●●●	●●●	●●●	●●●	●●●	●
Formulation*		MG	MG	●	MG	●	●	●
Bio ● NOP ○		●○	●○	●○	○	●○	●○	●○
Vinification status	Clarification via settling	✓	✓	✓	✓	✓		✓
	Clarification via flotation						✓	
Conditions	Normal	✓						
	Normal to difficult		✓	✓			✓	✓
	Very difficult (<i>Botrytis</i> , filterability)				✓	✓		
	Extreme (cold, hot)					✓		
Gain	Juice / Sediments ratio	●	●●	●	●●	●●	●●	●
	Time	●●	●●	●●●	●●	●●●	●●	●●
	Filterability	●	●	●	●●●	●●	●	●
Activities	Primary	Pectinase	Pectinase	Pectinase	Pectinase β-glucanase	Pectinase	Pectinase	Pectinase
	Secondary					Hemicellulase		
Indicative dosage		1 to 3 g/hL	1 to 2 g/hL	1 to 2 mL/hL	1 to 3 g/hL	1 to 2 mL/hL	2 to 3 mL/hL	1 to 3 mL/hL
Packaging		50g - 250g 1 kg - 10kg 20kg	50g - 250g 1 kg - 10kg	500mL 1 L - 10L	100g	1 L - 10L 20kg	1 L - 10L 20kg	1 L

* MG : micro-granule. ● : liquid.

PRE-FERMENTATION OPERATIONS – EXTRACTION / MACERATION

		MYZYM Ready Press™	MYZYM MPF™	MYZYM Extract™	MYZYM Ultra Extract™	MYZYM Red Fruits™	MYZYM White Fruits™
Wine colour		● ●	● ●	●	●	● ●	● ●
Formulation*		●	MG	MG	MG	MG	MG
Bio ● NOP ○		○	○	○	○	○	○
Vinification status	Pressing	✓					
	Skin maceration		✓				✓
	Maceration Extraction		✓	✓	✓	✓	✓
Conditions	Normal	✓	✓	✓		✓	✓
	Difficult	✓	✓		✓	✓	
Gain	Juice / Sediments ratio	● ●	● ●	●	● ●	● ●	● ●
	Filterability	●	●	●	●	●	●
	Full-bodiedness / structure		●	● ●	● ● ●	● ● ●	● ● ●
	Colour		● ● ●	●	● ● ●	●	●
	Aromas		● ●		●	● ● ●	● ● ●
Key activities	Primary	Pectinase	Pectinase	Pectinase	Pectinase	Pectinase Glycosidase (including arabinofuranosidase)	Pectinase β-glucosidase
	Secondary	Hemicellulase	Cellulase and hemicellulase	Cellulase and hemicellulase	Cellulase and hemicellulase	Cellulase and hemicellulase	Cellulase and hemicellulase
Indicative dosage		2 to 3 mL/hL	1 to 3 g/hL	2 to 3 g/hL	1 to 2 g/hL	1 to 2 g/hL	1 to 3 g/hL
Packaging		1 L - 20L	100g - 1 kg	100g - 250g 1 kg - 10kg	100g - 250g	100g 250g - 1 kg	100g - 250g 1 kg - 10kg

* MG : micro-granule. ● : liquid.

POST-FERMENTATION OPERATIONS – ELEVAGE

		MYZYM Élevage™	MYZYM Aroma™
Wine colour		● ● ●	●
Formulation		MG	MG
Bio ● NOP ○		○	○
Gain	Filterability	● ● ●	
	Structure	● ● ●	
	Aromas	●	● ● ●
Activities	Primary	β-glucanase	β-glucosidase
Indicative dosage		1 to 3 g/hL	2 to 5 g/hL
Indicative time of activity		2 to 6 weeks	3 to 6 weeks
Packaging		100g	100g

MG : micro-granule.



FAQs

How do enzymes act?

An enzyme is a protein capable of accelerating a biochemical reaction. All living organisms function as a result of enzyme activities. In wine, the enzymes that are generally used help «cut up» very large molecules into smaller fragments. In clarification, the various pectolytic and glucanase activities diminish must viscosity, reduce the action of protective colloids and therefore facilitate sedimentation by accelerating the process considerably. In extraction, these pectolytic activities are accompanied by secondary activities (cellulases and xylanases) which help weaken the grape's skin at cellular level, thereby releasing an inaccessible juice but above all constituents that are fundamental for quality, such as tannins, pigments, polysaccharides or aromatic precursors.

What's the purpose of enzyming? What's the advantage of enzyming when the harvest is healthy?

In sedimenting, enzyming is vital, since grapes contain a great quantity of pectins found in the juices. These pectins are present, including in healthy harvests, since they come from the grapes. They are very large polysaccharidic molecules which increase must viscosity, considerably slowing down the sedimentation process. The grape's pectinases are insufficient or even too inhibited (cases of hydric stress in the vineyard) to deal with this obstacle.

In extraction and maceration, using suitable formulations makes it possible to access phenolic or aromatic fractions that are difficult to exploit simply via mechanical actions, especially in a short lapse of time such as cold pre-fermentation maceration. It also helps increase yield of free-run juice, limit crushing and stabilise colour, all of which have considerable impact on the quality of the wine.

Why are there different sorts of enzymes?

Each target has its enzyme formulation. The generic term «pectinases» covers more or less concentrated preparations in the three main sub-categories of pectinases (pectinesterases, endo- and exopolygalacturonases and pectinolyases), and more or less rich in secondary activities of oenological interest of extraction and/or bringing out qualities (arabinanase, galactanase, rhamnogalacturonase, hemicellulases, glycosidases, etc.).

"I don't want to use enzymes because they are chemical products"

Enzymes are intimately linked to life and are present in all living beings. Although enzyme preparations follow highly technical purification processes, they remain natural tools for vinification, present to a lesser extent in grapes.

When should enzymes be placed in position? For white wines, should enzyming be carried out in the press cage or in the sediment tank?

The enzyme should be added as early on in the process as possible, in order to take advantage of the enzyme activity as soon and as long as possible. It is therefore generally preferable to enzyme in the reception hopper, even before the press itself, so as to increase the extraction of juice and aromatic precursors at the pressing stage.

Should dosage be increased if musts are cold? What is the optimum temperature for using enzymes in maceration for red wines? Cold pre-fermentation maceration: what are the limit and optimum temperatures for use?

Pectinases activities are generally optimum at a temperature close to 50°C. This is far from traditional maceration conditions, except for thermovinifications and hot pre-fermentation maceration (processes in which the level of pectic substances is still high).

Enzymes are considered as conserving an activity at temperatures superior to 5°C. They are not destroyed by cold, simply slowed down.

If musts are too sedimented (low turbidity), will there be more difficulty in fermentation and consequently an increase in volatile acidity?

There is a risk, but introducing a small quantity of lees once more in order to raise turbidity slightly will be sufficient. Moreover, using yeast protector ACTIPROTECT+™ in yeast rehydration will diminish the risks of fermenting stress linked to low turbidity. In any case, rapid elimination of sedimentation by using enzymes is still a guarantee for microbiological, thus fermenting safety.

Why does an enzyme seem more efficient for one vintage over and against the following one?

The efficiency of an enzyme preparation depends on the right match between dosage, conditions of the liquor and the raw material itself. From one vintage to the next, parameters such as hydric stress, thickness of the grape skin, pH, the quantity of pectins or beta-glucans, etc. can change radically, requiring different dosage or even sometimes a different enzyme formulation.

Would it be interesting to use glycosidases on so-called non-aromatic grape varieties?

Even if so-called «neutral» grape varieties only have few terpenic and norisoprenoid precursors, the action of glycosidases nevertheless helps bring out the latter, thereby enhancing the fruity intensity of wines. Moreover, these enzymes can bring out beta-damascenone, an enhancer of fruity aromas of wine.

What is activity? Can I compare the activity of preparations of different suppliers?

The activity of an enzyme is a measure of its power to accelerate a specific reaction on a given substrate, for example a pectic compound. There are, however, different methods and units of measurement of enzyme activities, which often make it quite difficult to compare one preparation with that of another supplier. Finally, the notion of activity in itself is in any case insufficient to measure the efficiency of an enzyme formulation, since it is the synergy between all activities of the preparation in a real must which will play a decisive role, and not each one taken separately in a standard liquor.