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BIOPROTECTION

BIOPROTECTION, HOW AND WHY?

→ **BIOProtection** consists in the addition of a living organism to occupy the ecological niche and thus limit the predominance of potentially undesirable indigenous microorganisms.

→ In practical winemaking terms, it means applying selected microorganisms to the grapes or must to limit the occurrence of changes harmful to wine quality.

PREREQUISITES

- Microorganisms selected from the grape and/or must microflora, to guarantee their oenological origin.
- Microorganisms with low fermentation activity at the inoculated dose and able to colonise the medium.
- Selection of high-quality strains from among recognised species.

TWO BIOPROTECTION SOLUTIONS FROM LAFFORT®

ZYMAFLORE® EGIDE™	ZYMAFLORE® KHIO™
Mixture of 2 strains of the species *Torulaspora del-brueckii* and *Metschnikowia pulcherrima*	Specific strain of the species *Metschnikowia pulcherrima*
Capacity to become established +++	Very low fermentation activity
Robustness to non-rehydration +++	Resistance to cold ++++
Low fermentation activity	Robustness to non-rehydration +++
Resistance to cold ++	Long pre-fermentation phases

Table 1: Characteristics of the two BIOProtection solutions from LAFFORT®.

PRE-FERMENTATION PHASES AT VERY LOW TEMPERATURE

ZYMAFLORE® KHIO™

NEW

The LAFFORT® solution for the BIOProtection of grapes and musts at low temperatures.

Specific strain of the species *Metschnikowia pulcherrima* for especially long pre-fermentation phases.

- During stabulation of white and rosé musts.
- In the tank, for long periods of cold soaking before fermentation.

In the case of long pre-fermentation phases at very low temperature, the presence of nutrient-rich solids can encourage the growth of indigenous microflora.

The latter can lead to spontaneous alcoholic fermentation, making must clarification more difficult and impacting the final quality of the wine. This also makes it more difficult to establish a selected *S. cerevisiae* yeast to carry out a clean alcoholic fermentation.

Long stabulation: absence of fermentation activity of ZYMAFLORE® KHIO™.

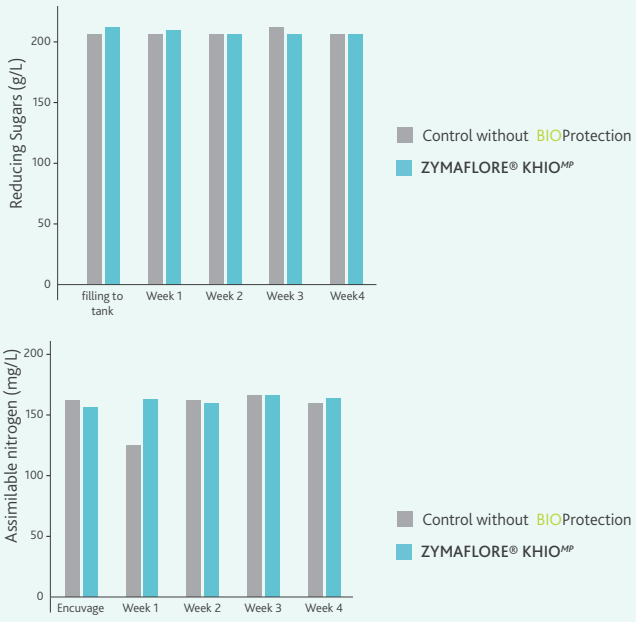

Figure 1: Stabulation for 4 weeks on total solids, between 0 and 2°C. Inoculation with 5 g/hL of ***ZYMAFLORE® KHIO™****.*

Monitoring reducing sugar and assimilable nitrogen during stabulation makes it possible to verify the **absence of fermentation activity during the 4-week stabulation.**

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Impact of ZYMAFLORE® KHIO^{MP} on indigenous *S. cerevisiae* yeasts.

Distribution of the different yeast populations in the must at the end of stabulation (counting on specific medium).

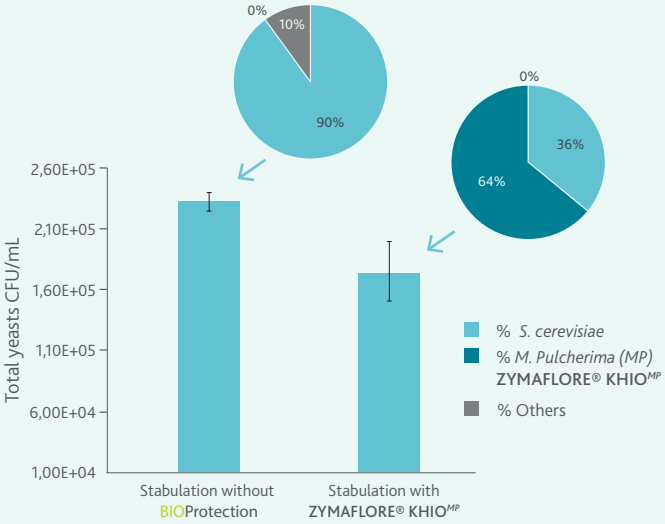

*Figure 2: Stabulation for 10 days at 4 °C. At the start of stabulation Inoculation with **ZYMAFLORE® KHIO^{MP}** at 5 g/hL.*

Control tank: more than 90% of the microflora present at the end of stabulation are indigenous *S. cerevisae* yeasts.

With inoculation: significant colonisation of **ZYMAFLORE® KHIO^{MP}**, limiting the development of indigenous *S. cerevisiae* yeasts (only 36% of total yeasts). BIOProtection limits the risk of fermentation starting spontaneously during stabulation.

BIOPROTECTION & SO_2 REDUCTION

ZYMAFLORE® ÉGIDE^{TDMP}

The LAFFORT® solution for the BIOProtection of grapes and musts, particularly suitable as part of an SO_2 reduction strategy.

Made up of 2 strains of the species *Torulaspora delbrueckii* and *Metschnikowia pulcherrima* in order to **adapt to all situations and preserve wine quality.**

- Early application to all equipment in contact with the grapes: harvesting and grape reception equipment, transport tankers, etc.
- When red grapes go into tank, regardless of the pre-fermentation protocol.
- At the latest, after pressing for BIOProtection of musts until inoculation with *S. cerevisiae* (AF).

Impact of SO_2 reduction.

When SO_2 is reduced, the microbiological pressure on the must is increased. Indigenous populations are larger than after conventional sulphite addition. Depending on the oenological context, the effect can be variable (*table 2*).

Influence of sulphite levels according to the species at the pre-fermentation stage.

	SO_2 -	SO_2 +
Saccharomyces cerevisiae	↘	↗
Starmerella bacillaris	→	→
Hanseniaspora uvarum	↗	↘
Torulaspora delbrueckii	↘	↗

Table 2: PREFERMENT project - Albertin et al., 2014.

Reducing SO_2 is not just quantitative. It is also qualitative and reshapes the microbial balance of the must.

Not all yeast species present react in the same way to variations in SO_2 levels. Among them, one seems particularly favoured in situations where use of SO_2 is limited: *Hanseniaspora uvarum* (production of VA).

EFFECT OF BIOPROTECTION IN THE CONTEXT OF SO_2 REDUCTION.

Comparison of Merlot grapes from the same harvest vinified without SO_2 and both with and without BIOProtection . In the case of the grapes without sulphite and without BIOProtection, the microbiological pressure of the must is such that it prevents the inoculated *S. cerevisiae* yeast from becoming established after the pre-fermentation period. The consequences are oxidative markers at higher levels than in the case of the no-sulphite but BIOProtected grapes, for which the alcoholic fermentation has been better controlled.

		No sulphite	No sulphite + ZYMAFLORE® EGIDE^{TDMP}
Analysis during AF	Establishment of the *S. cerevisiae* strain	Negativ	Positiv
Analysis at end of AF	TL35 (mg/L)	74	61
	Ethyl acetate (mg/L)	86	61
	VA (g/L H_2SO_4)	0,22	0,13

*Table 3: Check of colonisation carried out after inoculation with an active dry yeast S. cerevisiae (20 g/hL), coupled or not with **ZYMAFLORE® ÉGIDETD^{MP}** (5 g/hL). The must underwent a 48 h pre-fermentation period at 12°C.*

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