Cold soak management by selected *Metschnikowia pulcherrima* yeast

Vincent Gerbaux[(1)], Isabelle Adventure[(1)], Anne Guilloteau[(1)], Françoise Raginel[(2)], Anthony Silvano[(2)] and Anne Julien-Ortiz[(2)]

[(1)] IFV (Institut Français de la Vigne et du Vin), Beaune, France - [(2)] Lallemand SAS, Blagnac, France.

Abstract

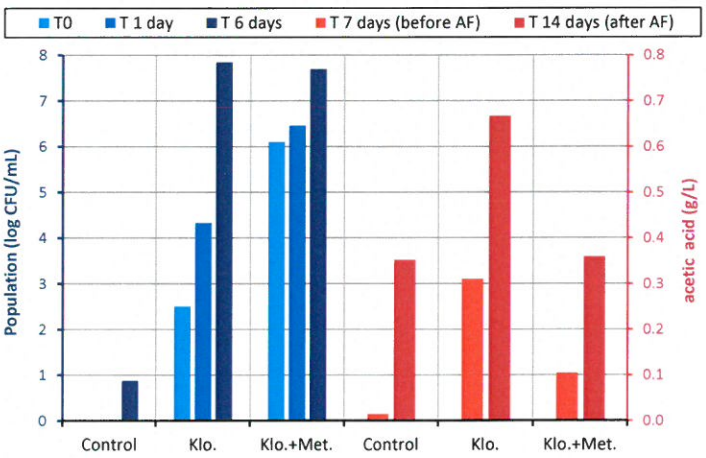
Pre-fermentative cold soak is a potentially risky winemaking practice due to spoilage yeast such as *Kloeckera apiculata* (syn. *Hanseniaspora uvarum*). Early inoculation with a specific *Metschnikowia pulcherrima* helps with the control of potential spoilage organisms. *Metschnikowia pulcherrima* is found on the grape microflora and it does not actively ferment but it does help with the balance of aromas. A selected *Metschnikowia pulcherrima* yeast named Gaïa$_{MP98.3}$, was produced in active dried form by Lallemand and evaluated for cold soak application. This biomass resisted moderate SO_2 additions and maintained a population higher than 10^7 CFU/mL during pre-fermentative cold soak at different temperatures. The presence of Gaïa$_{MP98.3}$ during cold soak limited *Kloeckera apiculata* growth and acetic acid production. This opens new ways to manage pre-fermentative cold soak with a biological alternative to SO_2.

Introduction

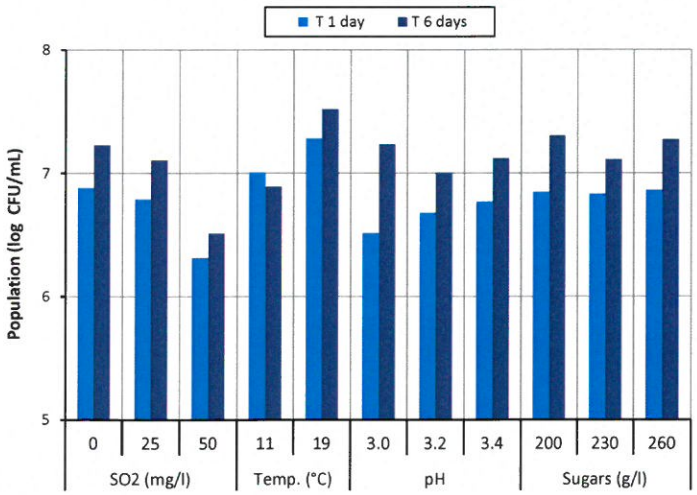
Pre-fermentative cold soak is a winemaking process often used to improve color and fruit aromatic quality of red wines. The impact on color is linked to high SO_2 additions. The aromatic quality is mainly linked to the yeast flora. However, the grapes flora is also composed of *Kloeckera apiculata* which is a high producer of acetic acid and ethyl acetate. Must colonization by a non-fermentative selected yeast can help to control undesirable flora during cold soak. An unique collection of *Metschnikowia pulcherrima* was selected from more than 500 yeast isolated in Burgundy. They were then screened to determine their winemaking attributes during cold soak as well as their sensory impact.

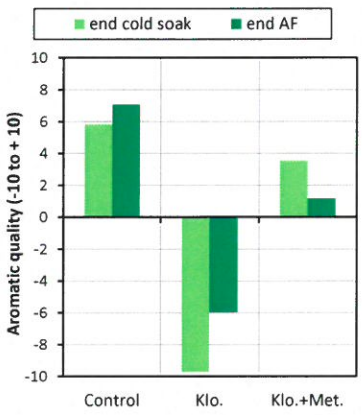
Activity of *Kloeckera apicula*ta (Klo.) depending on the presence or not of *Metschnikowia pulcherrima* Gaïa$_{MP98.3}$ (Met.).

T0 : *K. apiculata* and *M. pulcherrima* - T0 to T7 days : Cold soak (15°C)
T7 days : *S. cerevisiae* - T7 to T14 days : AF (20 to 24°C).

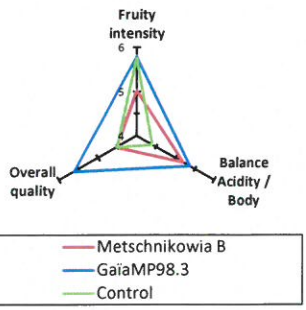


***Metschnikowia pulcherrima* implantation in must at different environmental conditions**





Sensory evaluation of Pinot Noir fermented with a cold soak with or without *Metschnikowia p.*
average for 2 millésimes.



Conclusions

The winemaking interest of using *Metschnikowia pulcherrima* to ensure the bio-control of musts is confirmed. Produced in active dry yeast (ADY) form, the Gaïa$_{MP98.3}$ yeast implants very well in the current conditions of cold soak. The presence of *Metschnikowia pulcherrima* limits acetic acid production by *Kloeckera apiculata,* a common indigenous flora from grapes. No negative impact was noted on the alcoholic fermentation kinetics in the Pinot noir trials, with about 250 mg/L of yeast assimilable nitrogen. Early inoculation with Gaïa$_{MP98.3}$ optimizes the qualitative interest of a cold soak process.

Selection of a new wine lactic acid bacteria starter culture for red and rosé wines

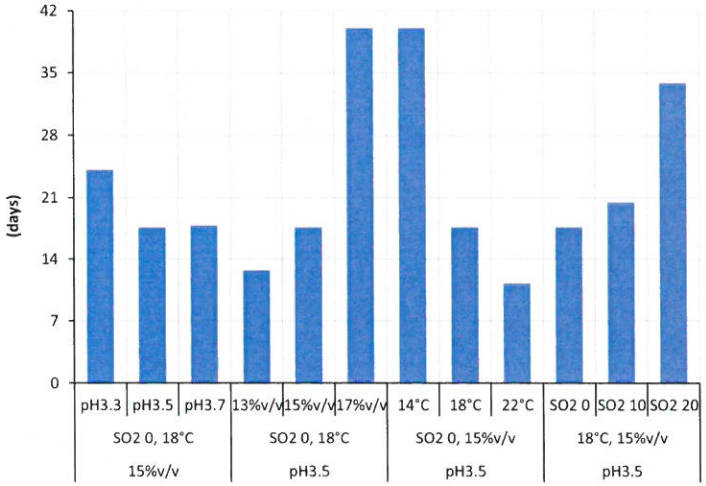
Vincent Gerbaux[(1)], Carole Briffox[(1)], Magali Bou-Deleris[(2)], Anthony Silvano[(2)] and Sibylle Krieger-Weber[(2)].

[(1)] IFV (Institut Français de la Vigne et du Vin), Beaune, France - [(2)] Lallemand SAS, Blagnac, France.

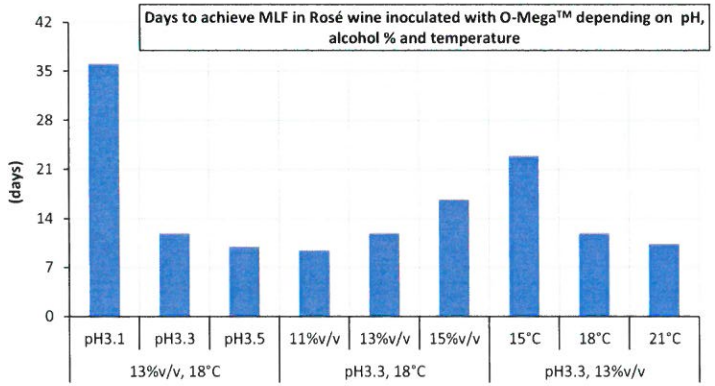
Introduction

The increasing use of selected wine bacteria makes it essential to develop new malolactic starter cultures with unique properties. After a 4 year selection and development program a new wine bacteria was selected among an original collection of more than 200 *Oenococcus oeni* strains isolated from white, rosé and red wines. The objective was to select a wine lactic acid bacteria strain able to conduct MLF in a broad range of red and rosé wine conditions. In addition to having a strong malolactic activity, the criteria of selection included a low production of volatile acidity, a sensory contribution to varietal fruit aromas and a low impact on wine color. The selected strain called O-Mega™ is genetically original and can be produced with the MBR®process under freeze-dried form. This strain is capable of reliably completing malolactic fermentation in low pH rosé wines (pH=3.1) and in high ethanol red wine (16% v/v). Since O-Mega™ degrades very little citric acid it does not mask fruit aromas by avoiding diacetyl production.

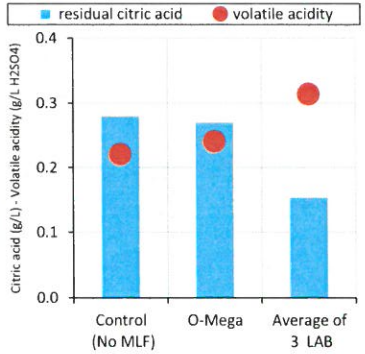
Time to achieve MLF in a Pinot noir wine inoculated with O-Mega™ depending on the wine environment



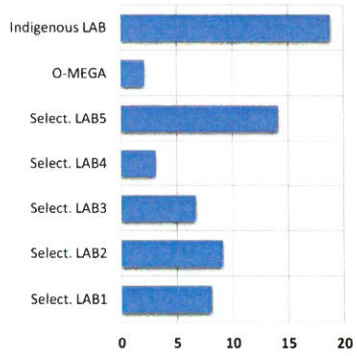
Days to achieve MLF in Rosé wine inoculated with O-Mega™ depending on pH, alcohol % and temperature



Residual citric acid and levels of volatile acidity - Pinot noir at bottling (level of citric acid before MLF: 0.35g/L)



Diacetyl content (mg/L) in wines. Comparative trial with different LAB.



Results of practical trials with the strain O-Mega™ in different varietals

	RS	CH	Merlot	CS	Tannat	Temp.	Barbera	CS
Timing of inoculation	**Co-inoc.**	**Co-inoc.**	**Post AF**	**Post AF**	**Post AF**	**Post AF**	**Co-inoc.**	**Co-inoc.**
pH	3.25	3.20	3.26	3.31	3.67	3.53	3.00	3.60
Ethanol (%v/v)	12.1	14.4	12.3	11.9	14.9	14.9	14.8	13.5
Temperature (°C)	17/20	15/18	15	15	20	17	25	23
Duration of MLF (days)	**25**	**18**	**39**	**48**	**19**	**37**	**11**	**4**

Conclusions

The selected wine bacteria O-Mega™ is a robust and versatile strain, able to achieve MLF in a very broad spectrum of wine conditions. Depending on wine conditions, MLF length was between 10 and 40 days. The late and slow metabolism of citric acid by O-Mega™ results in a low production of acetic acid and diacetyl and does not mask varietal character.