MANNOSTAB®

PATENT N° 2726284

OSTAB®

NATURAL STABILITY OF WINES

Ten

years of research and development by ***LAFFORT*** *has led to a revolutionary new product, Mannostab. Our scientists have been able to isolate, identify and extract from yeast a specific* ***a macromolecule capable of tartrate stabilization for white, rose and red wines. This exciting new tool allows winemakers the option of replacing the process of cold stabilization.***

VINITECH
TROPHEE OR
INNOVATION 2006

This work was recognized by winning the Gold Innovation Trophy at Vinitech 2006 in Bordeaux, France. This is the first time the Gold Trophy has been awarded to a manufacturer of œnological products for its contribution to research.

Mannostab® : the first natural treatment for the potassium bitartrate stability of potassium salts in wines.

Mannostab® is the only mannoprotein naturally present in wines with a potassium bitartrate stabilization property. This specific mannoprotein, called MP40™, is enzymatically extracted from yeast cell walls by a patented process (patent n°2726284), which guarantees and preserves the stabilizing capacity of MP40™ regarding potassium bitartrate precipitations.

Why is Mannostab® innovative?

Mannostab® is a targeted œnological treatment, based on the inhibition of potassium bitartrate crystallization. It provides a natural, simple solution to the stability requirements of filtered or non-filtered wines.

- A natural constituent already present in wines, Mannostab® perfectly conserves the quality of the wine.
- Involving no waste materials, no energy or water consumption, Mannostab® is an ecological treatment which complies with new environmental constraints.

The production process of Mannostab® is covered by a French patent, N°94-13261, published in the "Bulletin Officiel de la Propriété Industrielle" under the n°2726284.

STAB®

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Research

Initial observation

Barrel lees ageing of white wines for several months is accompanied by improved potassium bitartrate stability.

The discovery of MP40®

A 40 kDa glycosyl-phosphatidyl-inositol anchored mannoprotein (*P2 peak in Figure 1*) causes the inhibition activity of potassium bitartrate salt crystallization (Moine-Ledoux and Dubourdieu, 2002). MP40™ is the only fraction amongst the many mannoproteins extractable from yeast that totally inhibits crystallization of these salts.

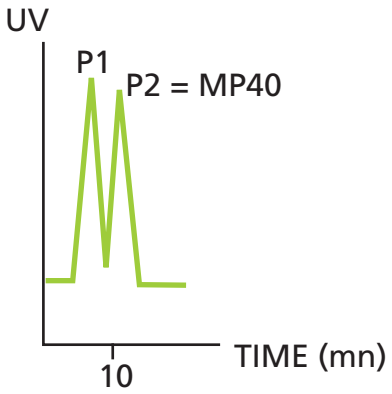


figure 1 : Fractions of mannoproteins enzymatically extracted from yeast cell walls by TSKG2000 size exclusion chromatography.

Inhibition of crystallization

The microscopic observation of the potassium bitartrate crystal development in the presence or absence of Mannostab® shows that Mannostab® prevents the preferential growth of certain crystal faces, flattening the shape of the crystals. The crystal only grows in a certain orientation (*figure 2*), *thus preventing it from precipitating*.

Sampling date	*27/06*	*30/06*	*02/07*	*04/07*	*07/07*
Control					
Mannostab®					

figure 2 : Microscopic observation of the development of potassium bitartrate crystals at -4°C in a solution with or without Mannostab®.

Specific case of neutral calcium tartrate precipitations:
Mannostab® does not allow wines to be stabilized with regard to this type of precipitation

The results

Treating wines with Mannostab® leads to potassium bitartrate stability levels which are comparable to traditional treatments, such as cold stabilization, and presents a lasting action over time, contrary to metatartaric acid.

	Storage at – 4°C				Alternating storage at 25°C and – 4°C in 2 week intervals			
Wine types	Untreated	MANNOSTAB®	Cold	Metatartaric acid	Untreated	MANNOSTAB®	Cold	Metatartaric acid
late harvest, AOC, Jurançon	5 days	> 95 months	> 95 months	> 95 months	19 days	> 95 months	> 95 months	4 months
dry white wine, AOC, Bordeaux	3 days	> 91 months	> 91 months	> 91 months	17 days	> 91 months	> 91 months	3 months
Red wine, AOC, Irouléguy	5 days	> 89 months	> 89 months	> 89 months	17 days	> 89 months	> 89 months	3 months
Rosé	4 days	> 89 months	> 89 months		17 days	> 89 months	> 89 months	

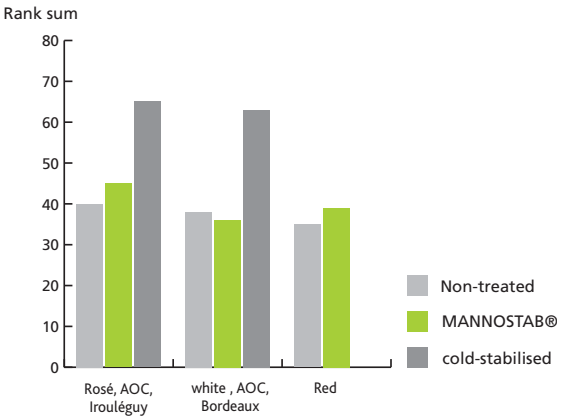
Specific case of red wines:
The instability of the colouring matter in red wines is a parameter which can compromise potassium bitartrate stability over time. Under these conditions, the efficiency of Mannostab® can be reduced.

Wine quality

Wines treated with Mannostab® conserve their acid-base balance and their colour is not modified.

Rosé wine	Untreated	Cold-stabilised	Mannostab®
Alc. (% vol.) at 20°C	12,45	12,45	12,35
Reducing sugars g/l	3,0	3,1	3,1
TA g/L	5,0	4,85	5,0
pH	3,4	3,4	3,4
VA g/L	0,26	0,23	0,21
Modified colour Intensity	1,10	1,01	1,1
TPI	12,4	10,4	12,2

With Mannostab® the original organoleptic qualities are preserved.



No significant difference between the non-treated wines and those treated with Mannostab®, both of which are significantly preferred over the wines treated with cold stabilization.

treatment

For which types of wine?

- For red, white and rosé wines.

- For still and sparkling wines.

- For filtered and unfiltered wines.

When?

Mannostab® is the last treatment before bottling.

In the case of filtered wines, it should be added between the pre-filtration and the final filtration phases.

With unfiltered wines, the treatment should be performed on the day before bottling.

How?

Mannostab® treatment must be supervised by an œnologist.

Correct dosages for each wine (between 15 and 30 g/hL) are determined by preliminary stability tests in order to prevent the risk of overdosage.

Two stability tests can be used:

- *Cold stability testing is easily performed in the winery.*
- *The mini-contact test is performed in a laboratory.*

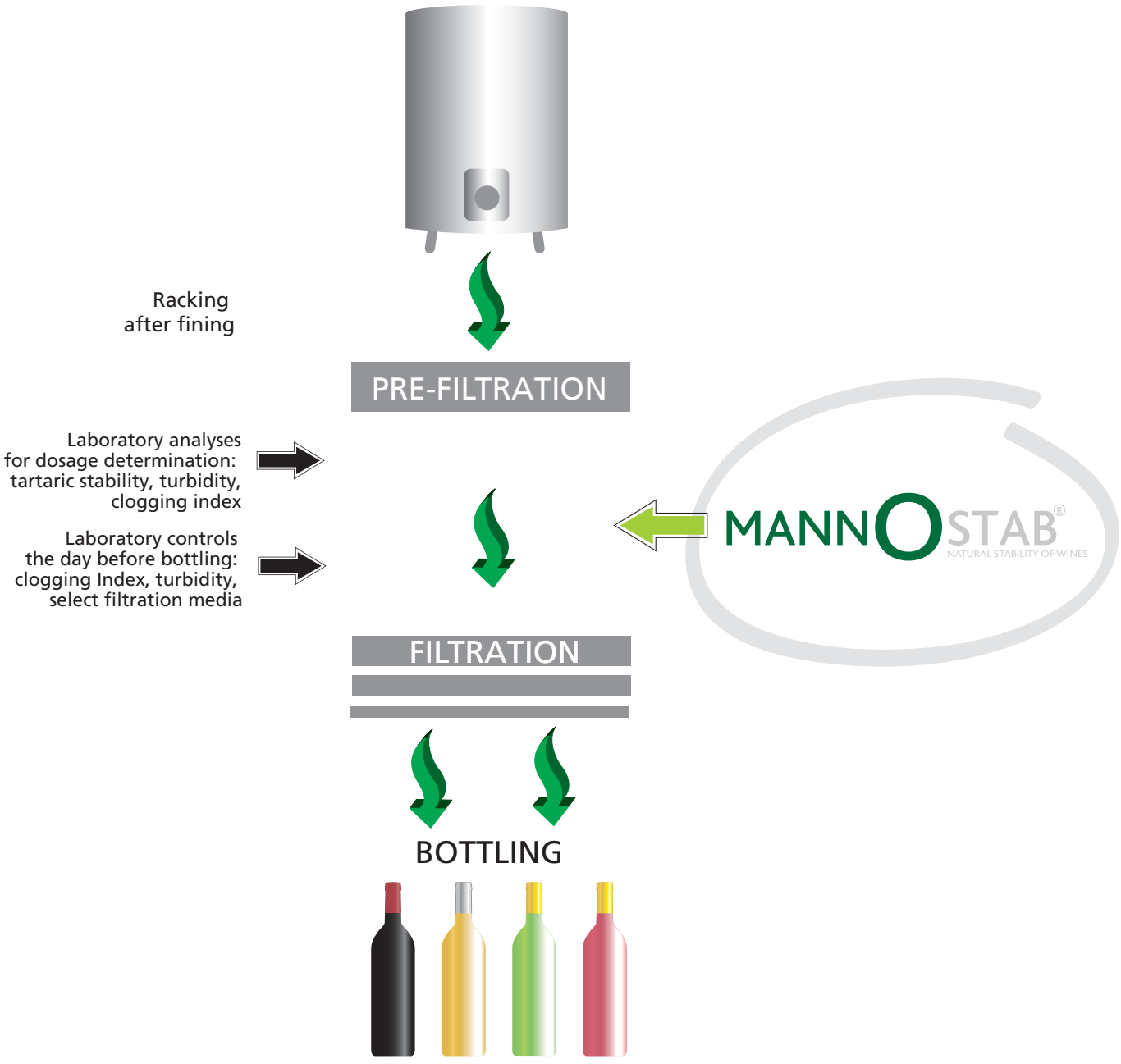
LAFFORT has developed a specific database which allows the correct Mannostab® dosage for each wine to be implemented with high precision, according to the results obtained by mini-contact tests. Once the dosage has been determined, it is essential to avoid any subsequent operations which affect the colloidal structure of the wine (blending, fining, pre-filtration, etc.) before Mannostab® is added. Equally, no treatment should be carried out after the addition of Mannostab®, excepting only SO_2, Stabivin® (gum Arabic) and ascorbic acid.

For wines which are filtered at bottling, strict control of filtration conditions is necessary. Indeed, while Mannostab® does not increase the clogging index of well prepared wines (Index < 50), a tight filtration could, however, retain colloids and/or Mannostab® and render the treatment useless.

The practical application of the product is very simple: dilute in ten times its weight of water at 30°C; leave to stand for a few minutes, add to the wine and homogenise.

The product is packaged in sealed 500 g sachets.

Key treatment stages



LAFFORT

l'œnologie par nature

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