

Biotechnological improvement in the production of wine: The role of pectinases

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OBJECTIVES

To determine the influence of pectinases on the winemaking process, and how these can influence on the final product.

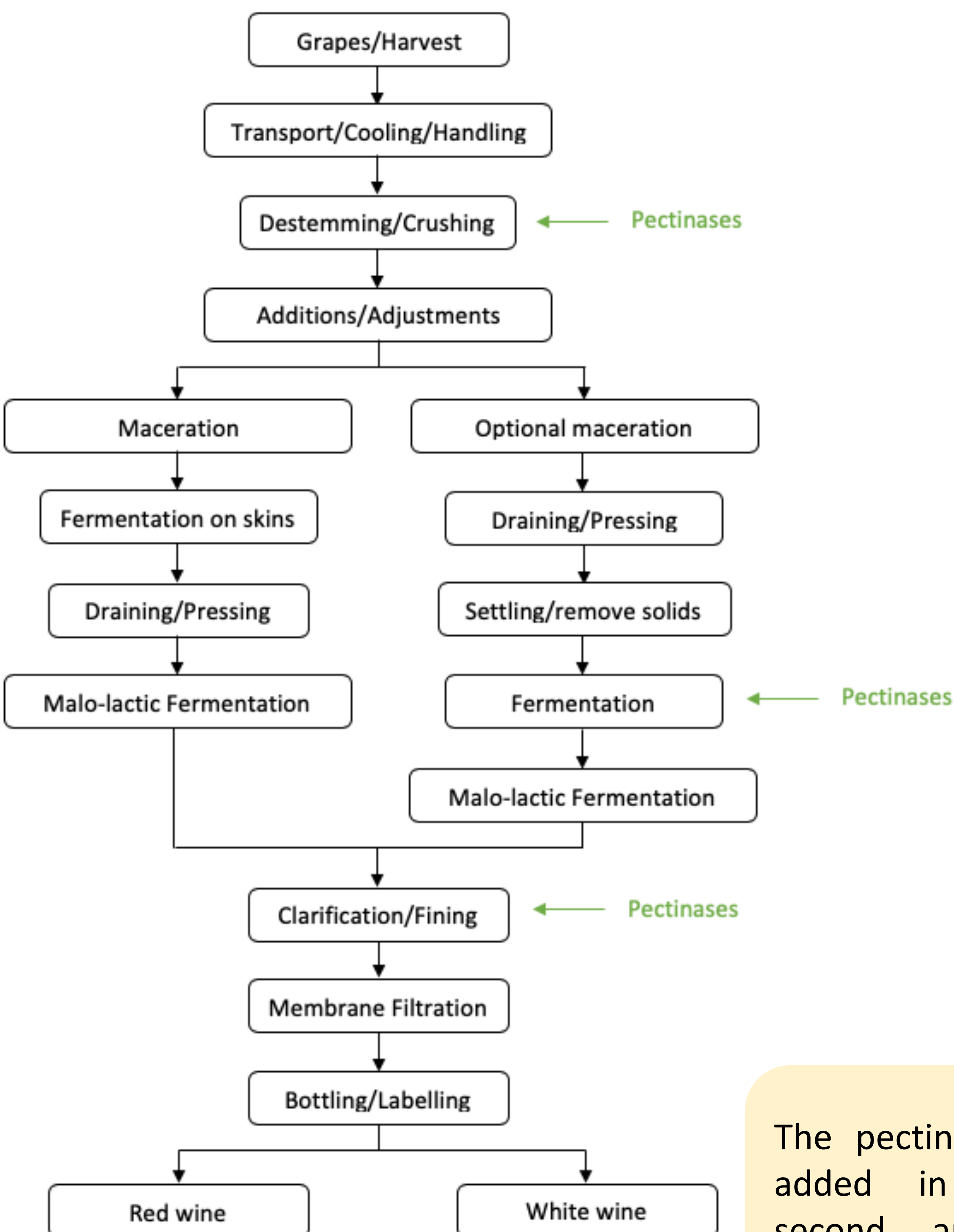


Figure 1: Flux diagram of the winemaking process of red and white wine.

The pectinases can be added in the first, second and/or third stages of the process

Effect of pectinases on clarification

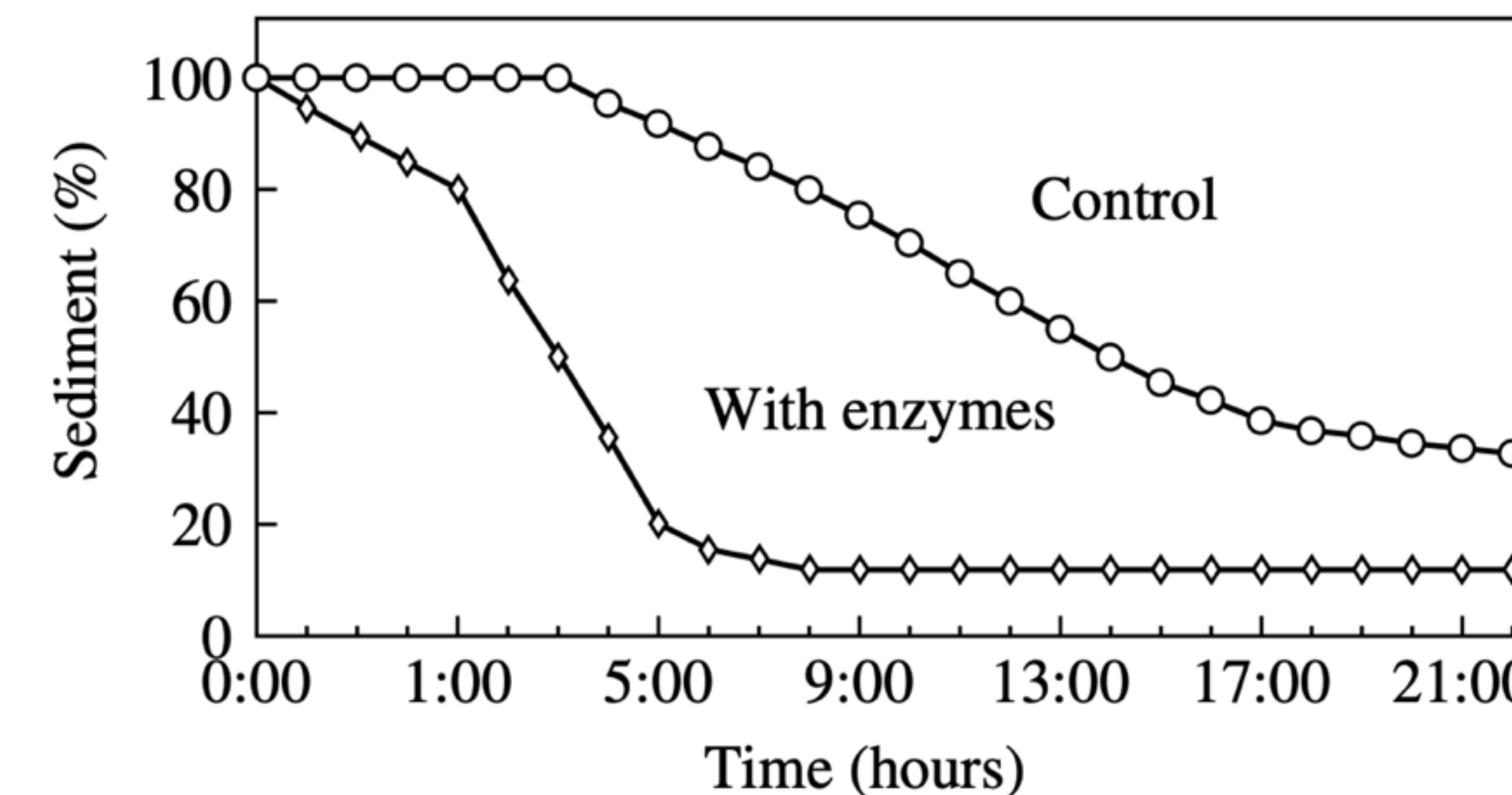


Figure 2: Effect of pectolytic enzymes on the sedimentation speed of white must lees.

Effect of pectinases on color extraction

Table 1: Influence of pectolytic enzymes on color extraction in red winemaking.

Wine (20 days of maceration)	Control Tank	Enzymed tank
Tannins (g/l)	3,5	3,8
Anthocyanins (mg/l)	768	895
Color intensity	1,58	1,68
Tint	0,44	0,40

Effect of pectinases in methanol levels

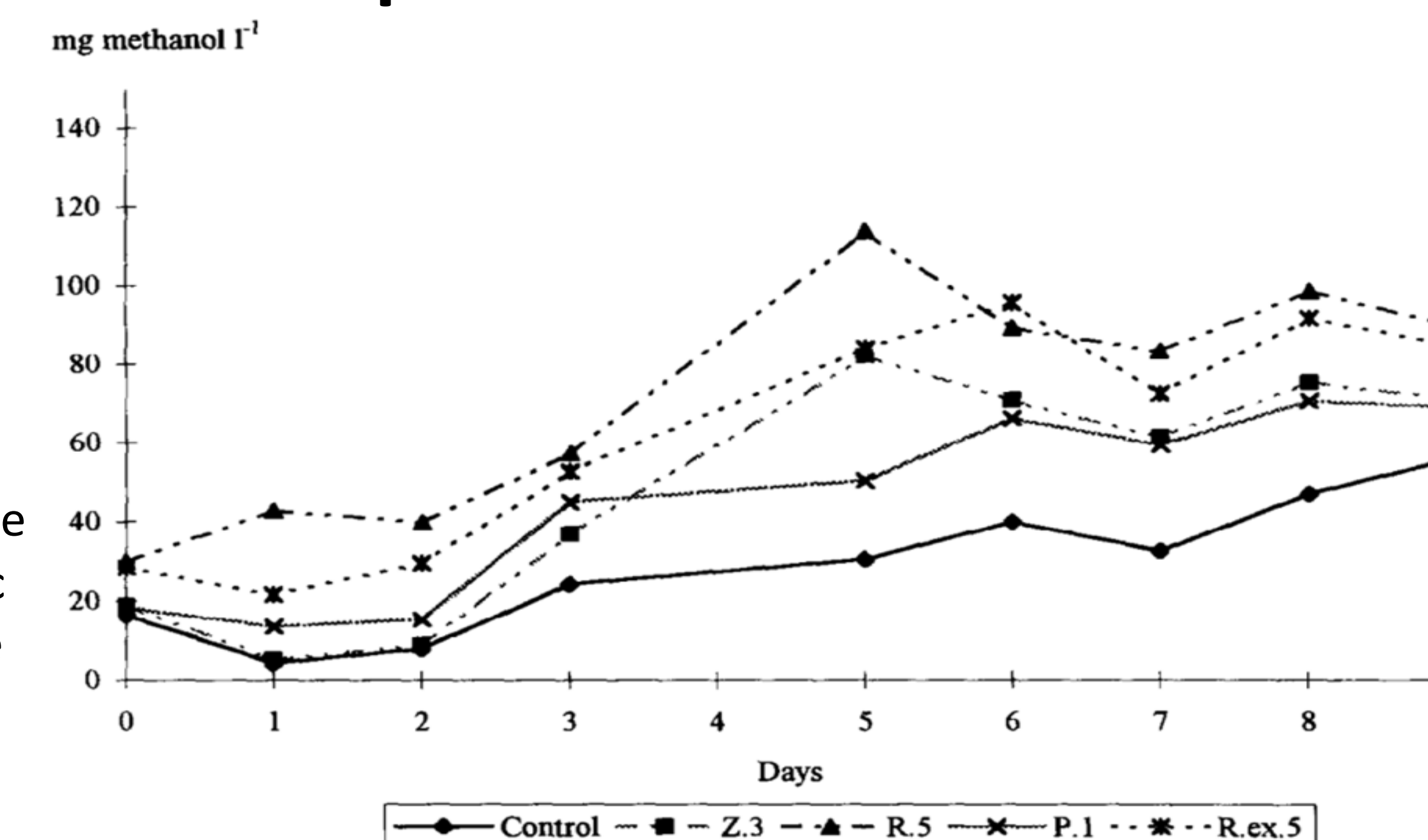


Figure 3: Evolution of methanol levels for the control and enzymatic treatments during the fermentation and in final wine

PROBLEM: The formation of a gel and the increase in the viscosity of the wine due to the pectins, make it difficult for the suspended particles to sedimentation.

SOLUTION: To add enzymatic preparations with pectinases to destabilize the colloidal balance and reduce the viscosity of the wine.

PROBLEM: The cell wall and the cytoplasmic membrane of the grape skin cells act as a barrier and hinder the release of these compounds into the must during fermentation.

SOLUTION: To add enzymatic preparations with pectinases to hydrolyze the pectins of the skin cells wall and to facilitate the liberation of the different compounds.

PROBLEM: The action of pectinmethylesterase generates methanol molecules.

CONCLUSIONS

- ✓ The part of the process where the enzymes are added is very important.
- ✓ Enzyme preparations are used instead of pure enzymes.
- ✓ Pectinases improve the clarification, filtration and extraction of compounds that contribute colour and flavour to the wine.
- ✓ Exogenous enzymes are used because the endogens do not resist the winemaking conditions.
- ✓ Enzymes can generate unwanted secondary compounds.
- ✓ In the future, the aim is to improve the effectiveness of enzymes by modifying the primary structure of these enzymes.

REFERENCES

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