

RAPIDASE® EX COLOR

(naturally FCE) (i.e: Faible Cinnamyl Esterase)

A new highly-concentrated formulation for optimum polyphenol extraction

The grape skin cell walls prevent the release of polyphenols (anthocyanins and tannins) into the must during fermentation.

These pecto-cellular walls are thus a limiting factor in red wine vinification.

The porosity of this restrictive barrier can be increased by partial hydrolysis of the polysaccharide constituents (pectin, hemicellulose and cellulose).

Increased knowledge of the grape cell walls has enabled the Research and Development Department of DSM Food Specialties Oenology to define a new formulation of Rapidase® Ex Color, a maceration enzyme for red grapes.

This formulation has a highly concentrated pectinase activity (150,000 units AVJP per gr) as well as a secondary hemicellulase activity (endogenous glucanase and endogenous mannanase) which weaken the walls and increase porosity.

Grape skin polyphenols are then easily released into the fermenting must, resulting in a wine with darker and more stable color as the formation of a stable anthocyanin-tannin complex is aided.

Maceration enzymes do not extract grape seeds tannins.

Rapidase® Ex Color and side activities

The optimal production conditions (selected aspergillus Niger strain for enological use and fermentation of an immersed culture), allows DSM to produce pectic enzyme preparations with high pectinase and hemicellulase activities but natural low levels of unwanted side activities (cinnamyl-esterase and anthocyanases).

Analysis shows that the level of unwanted side activities in DSM enzymes are naturally lower than "purified" preparations, known as "purified" or "FCE". DSM production process allows low levels of cinnamyl-esterase to be achieved without going through a post-production purification treatment. In winemaking the use of DSM enzymes allows to avoid the formation of volatile phenols (vinyl-and ethyl-phénols).

Rapidase® Ex Color, an enzyme naturally low in unwanted side activities is a perfect answer to red winemaking requirements.

Formulated and granulated under strict quality control regulation (ISO 9002 certification), Rapidase® Ex Color is conform to the International Enological Codex regulations.

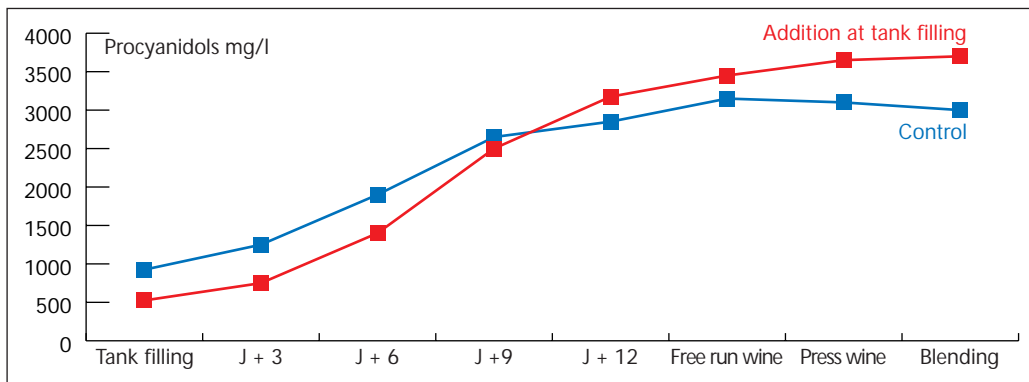
Using Rapidase® Ex Color in the cellar

The increased efficiency of the new Rapidase® Ex Color formulation has been confirmed by vinification trials in several wineries in the main wine producing areas. These trials were monitored by the Applications Department of DSM Food Specialties Oenology.

The various parameters checked (color intensity, TPI, free and combined anthocyanin content) confirm the increased extraction of polyphenols during maceration. This result is independent of the maceration technique employed (cap punch down, pumping over and délestage).



■ **Figure 1:** Cabernet Sauvignon Procyanidol content in the course of pumping over without (control) and with the addition of 2 g/hl of Rapidase® Ex Color at tank filling.



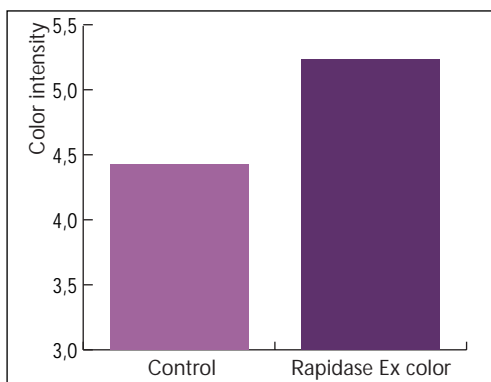
Model vinification trials:

The new Rapidase® Ex Color formulation has been tested on model vinification in technical institutes in several wine producing areas. These trials (Figures 1 and 2) have shown that there is a maximum efficiency in terms of polyphenol extraction and color stability.

These vinification experiments, carried out using homogeneous raw material, have shown that Rapidase® Ex Color is the most efficient in red wine maceration.

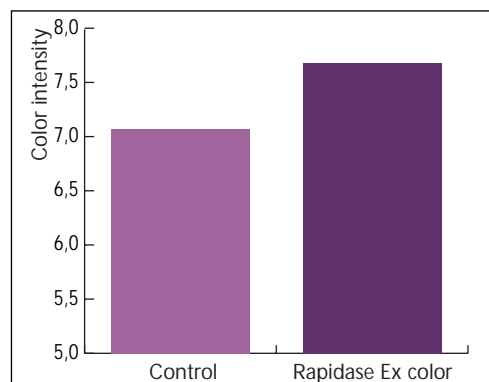
■ **Figure 2:** Color intensity (after six month's aging) wine from Grenache Noir obtained without (control) and with the addition of 3 g/hl of Rapidase® Ex Color.

Thirteen day's maceration, yeasting at 20 g/hl with Fermivin.



■ **Figure 3:** Cabernet Sauvignon wine Color intensity (after three month's aging) without (control) and with the addition of 3 g/hl of Rapidase® Ex Color.

Ten day's maceration, yeasting at 20 g/hl with Collection Cépage Cabernet Sauvignon.



Practical methods for the use of Rapidase® Ex Color

Rapidase® Ex Color is used at a dosage of between 2 and 5 g/hl, either as a single application at the tank filling or as two applications during maceration (half dose at tank filling and the other half at mid-maceration).

Normal doses of SO₂ employed during vinification do not inhibit the enzyme activity.