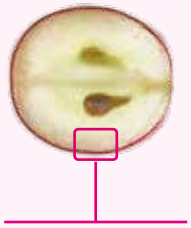
FOCUS

RED EXTRACTION ENZYMES

THE COMPLEXITY OF PECTIN STRUCTURE AS A FUNCTION OF THE LOCATION OF THE GRAPE BERRY CELLS.



Research programme (2013-2016) - **BIOLAFFORT®** in collaboration with John P. Moore's team (University of Stellenbosch).

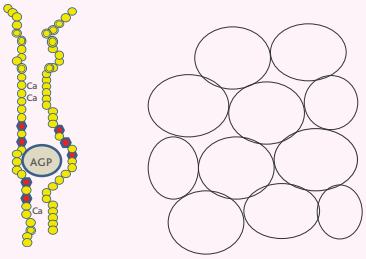
SCHEMATIC DIAGRAMS INSPIRED BY "HYPOTHETICAL MODEL OF THE GRAPE WALL", YU GAO, 2016.

PULP CELLS

Pectin structure: mainly composed of galacturonic acid, with little branching. This constitutes the main, linear chain of the pectin.

Technical objectives of the enzyme:
- Optimisation of pulp extraction while pressing.
- Optimised depectinisation and clarification of juices.

For this application, a suitable enzymatic formulation must mainly be composed of pectinases (PL, PG and PME*).

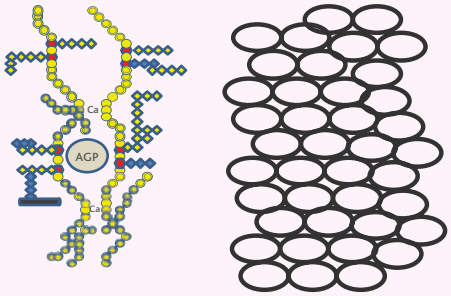


PULP - SKIN CELLS

Pectin structure made up of linear parts (main chain) and branched portions (secondary chains).

Technical objectives of the enzyme:
- Extraction of compounds of interest.
- Increase in juice extraction yield.
- Depectinisation and clarification of juices and wines.

For this application, the enzyme formulation must combine the main activities (PL, PG and PME) and secondary activities that promote the degradation of the branched portions and give the pectinases access to the main chain.

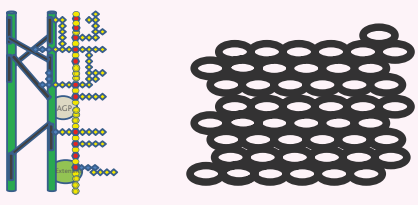


SKIN CELLS

Pectin structure made up of linear parts (main chain) and many branched and complex portions (secondary chains).

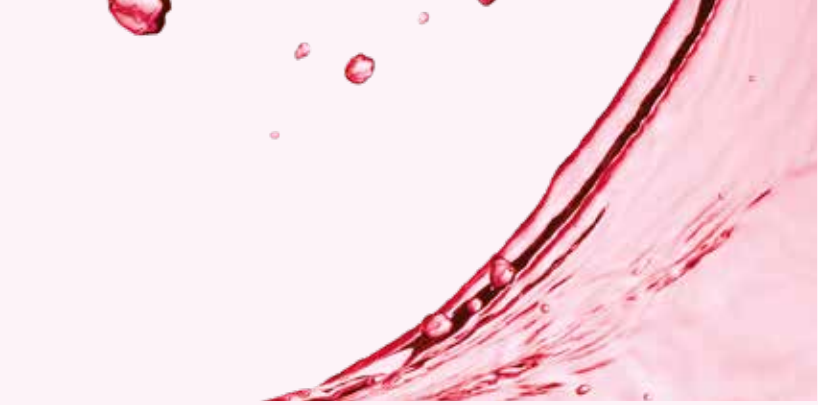
Technical objectives of the enzyme:
- Extraction of compounds responsible for improved mouthfeel or softening tannins, e.g. Rhamnogalacturonan II.
- Increase in juice extraction yield.
- Depectinisation and clarification of wines.

For this application, the enzyme formulation must combine the main activities (PL, PG and PME) and specific secondary activities such as Rhamnogalacturonase II for the extraction of positive compounds of interest.



Schematic representation of grape berry cells.

** PL: Pectine Lyase / PG: Polygalacturonase / PME: Pectine Methyl Esterase.*



FOCUS

OBJECTIVES OF THIS RESEARCH PROGRAMME:

- To study the impact of enzymes during the maceration of red grapes.
- To understand the extraction mechanisms of cellular compounds under winemaking conditions for the differentiation of **LAFFORT®** maceration enzymes.

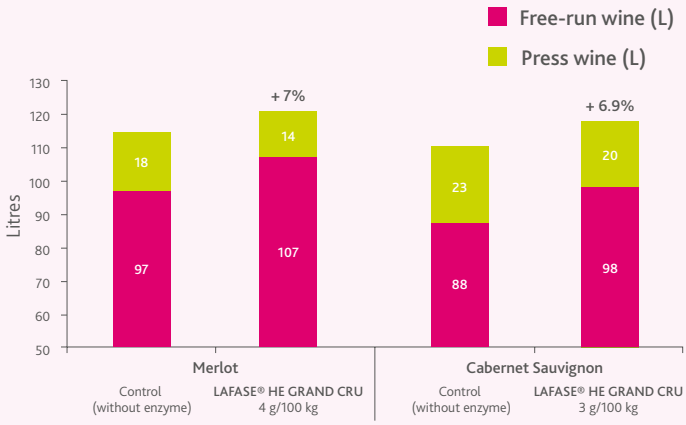
For more details, see our article "Structure de la paroi cellulaire du raisin rouge" RDO no. 172 - July 2019.

IMPACT OF RED EXTRACTION ENZYMES ON FINISHED WINES

Actions common to all LAFFORT® red extraction enzymes.

→ QUANTITATIVE OPTIMISATION:

Increasing the overall yield, especially free-run wine in relation to the total volume.



Wine volumes when pressing: free-run and press wine
*Pilot-scale study carried out at the **LAFFORT®** experimental cellar.*

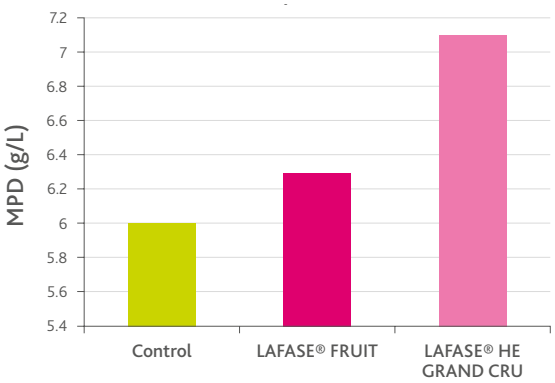
→ QUALITATIVE OPTIMISATION:

Improving the release of compounds of interest and facilitating clarification steps for the preparation of wines for bottling.

- Promoting the release of phenolic compounds such as anthocyanins and tannins.
- Improving colour stability by extracting phenolic compounds that are more stable over time.
- Contributing to the sensory quality of wines: extraction of Rhamnogalacturonan II and similar compounds which combine with tannins, leading to a reduction in astringency (Vidal 2004).
- Respecting the fruit profiles of wines through selective extraction by specific secondary enzymatic activities.
- Depectinisation of wines: facilitating the filtration and clarification of wines for bottling.

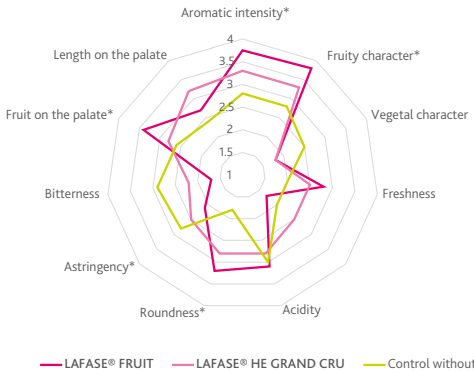
This study here under illustrates the capacity of **LAFASE® FRUIT** and **LAFASE® HE GRAND CRU** to extract cellular compounds of interest by the selectivity of their enzymatic spectrum of action.

Average degrees of polymerisation - Merlot



*Study carried out at the **LAFFORT®** experimental cellar (2 hL tank, enzyme doses of 3.5 g/100 kg of grapes). MPD is a marker for the extraction of skin tannins. A higher value corresponds to more supple tannins.*

Descriptive sensory analysis - Merlot



*This tasting was carried out by 19 trained tasters on a Merlot wine after malolactic fermentation. The wine-making conditions were identical. Enzyme doses of 3.5 g/100 kg of grapes. - *Statistically significant.*

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