CRUSHING
FILTERING | CLARIFICATION
MATURATION | FINISHING

ENZYMES

Endozym® enological enzymes
THE RESEARCH
From the scientific point of view, it is clear by now that the ancient saying “a small cask makes good wine” is not at all wrong. In order to process a good wine, it is indispensable to manage the evolution of grapes’ proanthocyanidinic tannins. These compounds characterize the taste of the wine, grant its longevity and are one of its main nutraceutical qualities.

Wine proanthocyanidins consume oxygen to get modified, larger and more full-bodied, and at the same time they avoid that the air oxidizes aromas and anthocyanins. The main importance of the refinement is the management of the oxygen spreading into the wine: involuntarily, with the racking and technological operations; voluntarily, with micro-oxygenations and through the porosity of the cask wood.

The REFINEMENT is a basic stage for the production of quality wines. It is essential for smells, as it enables the fermentative aromas to melt and to equilibrate with the varietal ones, in order to fully express the complexity of the wine.

During the refinement, the excessive tannin content, the astringency and the aggressiveness typical of young wines evolve to give fullness and roundness to the taste. The red colour, bright but unstable, changes into violet and winning tones, preannouncing an aromatic richness and a taste wideness.

A refinement not properly managed creates anomalous smells because of the accumulation of hydrogen sulphide or acetaldehyde, too gold or orange colours, and above all strong gustative defects, with dry and unpleasant tannins.

THE IDEAS OF THE AEB GROUP
AEB Group, protagonist of the wine-producing field since over 40 years, matured a wide experience in the reasoned refinement of wines. With its attention constantly turned to the excellence and to the solution of technological problems, it has been possible to select and to propose to wine-makers high quality raw materials, with wide application experiences in a plenty of vines all over the world. The preparations of AEB Group are a guarantee of success:

Ellagitan® Barrique
Gives elegance and pleasantness.
Type: Ellagic tannin
Origin: Toasted oak wood
Action: Stabilizes the redox potential, avoiding wines’ tendency to reduction while wines are in the bottle
Application: To prevent reductions, improve sensations in the after-taste, ennoble the aromatic outline
When to use: At every stage, in particular before the bottling
Dosage: 5-30 g/Hl

Ellagitan®
Enhances the refinement and promotes the polymerization of grape tannins.
Type: Ellagic tannin
Origin: Castanea sativa
Action: Produces the ethanol needed for binding the anthocyanins to the proanthocyanidins; captures the free radicals which oxidize the aroma
Application: To stabilize colour and mellow astringency
When to use: At the end of fermentation and at every racking
Dosage: 5-10 g/Hl at every racking

Ellagitan® Chene
It builds up the potentiality of wine.
Type: Highly prized ellagic tannin
Origin: French oak wood
Action: Forms the ethanal necessary for binding the anthocyanins to the proanthocyanidins; highly effective in capturing the free radicals which cause oxidation
Application: To stabilize colour, mellow astringency, preserve and highlight varietal aromatic nuances, without contributing excessive woody overtones
When to use: At the end of fermentation and at every racking
Dosage: 5-10 g/Hl at every racking

Gallovin
Preserves the aromatic freshness.
Type: Gall tannin
Origin: Caesalpina spinosa
Action: It is an officinal tannin with an extremely high purity degree; it is able to remove the oxidizing enzymes (laccase and tyrosinase); it is very effective for removing possible reduced odours
Application: All white and red wines where the aromatic freshness should be preserved and the polyphenolic heritage should be safeguarded
When to use: On musts, in all refining stages or during bottling
Dosage: 2-15 g/Hl
**Protan® Malbec**  
Naturally integrates wines' polyphenolic structure.  
**Type:** Proanthocyanidinic tannin  
**Origin:** Malbec red grape pips. This variety was a part of the Bordeaux blend till the frost of 1956 and it was known for the softness of its tannins  
**Action:** Ennobles wines' tannic structure, ensuring at the same time a longer longevity  
**Application:** All wines with structure lacks or with a tendency towards oxidation  
**When to use:** In all refining stages or during bottling  
**Dosage:** 2-15 g/hL

**FORMULATED TANNINS**  
In casks and barriques, the oxygen interacts with grape tannins through wood ellagic tannins and this is why it is possible to reach the quality excellence. The experience matured by AEB enabled to formulate some tannins easy to be used, suitable to ennoble wine gustative structure, to ensure its longevity and to stabilize the colour.

**ELLAGITAN REFILL**  
It is a mixture of ellagic tannins obtained from wood with different toasting degrees. It was studied by AEB Group to integrate the tannin loss in used barriques, so that they can be used for a longer time without loosing their ability to promote the correct tannin evolution. This tannin fights against the beginning of reduced notes, common in many wines kept in used casks and in steel.

**ELLAGITAN CHIPS**  
The utilization of wooden chips does not influence only the aromatic characteristics, but it ennobles also the gustative characteristics of wines, making them more harmonious and less astringent. The interest towards wines with a pleasant tannic structure, harmonious and without astringent notes, is often associated with the need of light boisé notes, not covering the fruit typicalness.

Ellagitan Chips is a preparation with a prevalence of oak tannins completed with grape tannins, studied to process wines with an harmonious taste and to highlight the varietal aromatic notes.

**ELLAGITAN CHIPS**

**Protan® Raisin**  
For the refinement of wines.  
**Type:** Proanthocyanidinic tannin  
**Origin:** Unfermented grapes' skin  
**Action:** Supplies soft skin tannins which integrate perfectly with the tannic structure of wines. No further refining required  
**Application:** For increasing wine structure and rendering it more mellow and pleasant to the palate  
**When to use:** Before bottling or during refinement  
**Dosage:** 5-30 g/hL

**Protan® Bois**  
Strengthens and amplifies the tannic structure.  
**Type:** Proanthocyanidinic tannin  
**Origin:** Extracted from Quebracho wood through a double purification process, which partially polymerizes the vegetable proanthocyanidins, mellowing their harshness  
**Action:** Performs as final oxygen receptor  
**Application:** For preventing oxidation and colour loss; for increasing structure and for harmonizing and softening wines obtained from grapes not fully ripened or from quick macerations  
**When to use:** The best results are obtained with early additions  
**Dosage:** 5-30 g/hL

**TANISOPULÉ**  
This ellagic and proanthocyanidinic tannin combines with wine components in a few days and its reducing effect enables to obtain wines stable during time; when added both at the “liqueur de tirage” and the "liqueur d'expédition", it enables to improve the quality and the sensation of gustative fullness of sparkling wines fermented in the bottle or in autoclave. In wine vinegars it mitigates the smell and the aggressive taste of acetic acid.

**Protan® Pepin**  
To stabilize the colour, ideal for micro-oxygenation.  
**Type:** Proanthocyanidinic tannin  
**Origin:** Grape pips  
**Action:** Supplies noble grape tannins, which bind with anthocyanins; acts as final oxygen receptor  
**Application:** For increasing the structure of quality wines, for prolonging wine shelf life and for stabilizing colour  
**When to use:** In young wines still maturing, even with fractioned additions. Ideal when combined to micro- and macro-oxygenation  
**Dosage:** 5-30 g/hL
COLOUR EXTRACTION

In order to dissolve anthocyanins better and improve tannin extraction from the skin, which contribute to colour stability, Pascal Biotech* has selected some enzymatic preparations with a high hemicellulasic and cellulasic (CMC) activity. This pool of enzymes promotes colour extraction and reduces maceration time or the intensity of plunging the cap, preventing the extraction of bitter tannins. Being purified from the anthocyanasic activity, which decolorizes the anthocyanins, the Pascal Biotech* enzymes yield increased anthocyanins concentration, stronger colour intensity and more lively colour hues.

Endozym® Contact Pelliculaire
This is a pectolitic enzyme, with a high hemicellulasic activity obtained through the use of a boosted fermentation substrate. It is specifically indicated for fast and complete skin cell degradation in order to obtain, in less time, wines with a higher colour intensity.

Minimum dosage : 2 g
Packaging: 500 g cans

Endozym® Rouge
It is a complete enzymatic preparation, which combines its pectolitic properties with a high cellulasic and hemicellulasic activity. The multiplicity of its enzymatic action results in maximum extraction of the colouring matter and varietal aromas from red grapes. Its use ensures the production of qualitatively more structured and complex wines and also increases free run juice yield.

Minimum dosage : 2 g
Packaging: 500 g cans

Endozym® Rouge Liquid
This is the liquid form of Endozym® Rouge, easy to use, with the option of being automatically dosed.

Minimum dosage : 2 ml
Packaging: 1 kg bottles

Endozym® ICS 10 Rouge
This enzyme comes in a very highly concentrated liquid form; it is available in 100 grams blister packs. It has the same properties of Endozym® Rouge, but its liquid form enables a faster and more effective homogenization on the pomace, thus saving time during cellar operations.

Minimum dosage : 0,4 mL
Packaging: Stands containing 5 x 200 g blisters

DOSAGE
The minimum recommended dosage for each Endozym® product, varies according to the extractive and clarifying intensity required and is mostly influenced by the crushed grapes temperature. The time/temperature ratio (8 - 35°C), shows that for every 7°C drop in temperature, the required period necessary for the enzymatic breakdown is doubled. By using higher dosages, the unfavourable influence of low temperatures can be rectified. For example, if a dose of 1 g/hL at 18°C breaks down pectins in 2 hours, a dose of 4 g/hL will reduce the required time to 30 minutes.

INFLUENCE OF SO2
Used at normal dosages, SO2 has no influence on Endozym® enzymatic activity.

DIRECTIONS FOR USE
The selected Endozym® is diluted directly into 20-30 parts of sulphur-free must or demineralized water or added directly on to the grapes, crushed grapes or must. Use at beginning or during tanks filling.

SHELF-LIFE AND STORAGE
During the pre-packing stage, the Endozym® liquid range is sterilefiltered to ensure a storage period of 6 months without any loss of activity. If stored at a temperature of +6°C the activity loss is below 5% per year. The granulated range of products remains stable for at least two years at room temperature, with less than 5% activity loss from the third year.

ACTIVITY CONTROL
There are various methods for evaluating enzymatic activity. Pascal Biotech* uses a system directly linked to the concentration of Pectinlyase (PL), polygalacturonase (PG) and pectinesterase (PE); the total sum of these three activities yields the UP per gram unity. The Pascal Biotech*’s methods of pectolic units determination and relevant activity diagrams can be made available to all interested technical personnel.

STABILITY
To ensure that the liquid products have the same stability of granulated enzymes, a specific production system is implemented that endows the enzyme with proteins and carbohydrates generated during fermentation, thus increasing shelf-life. Therefore, the natural substrate developed during the production of these enzymes stabilizes the enzyme-substrate preventing activity loss.

The ENDOZYM® enzymes and substrates used during production are not derived from GMO.

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