



ENARTIS NEWS

FLOTATION

Flotation is widely used as a juice clarification technique to remove solids in a quick and efficient way. This process requires the injection of small bubbles of nitrogen or air into a pressurised chamber where the enzyme-treated juice is dosed with fining agents. This mixture is then pumped to the bottom of the flotation tank and gas bubbles are used to make the agglomerated particles rise to the surface of the tank, creating a cap that can be removed, leaving the clear juice below the surface. With flotation, juice is clarified to a desired level of turbidity and is ready to ferment within a couple of hours after pressing, contrary to traditional methods that depend on gravity and time. If you are contemplating improvements to your process that can save time and energy, flotation is one simple process that can have a big impact on your objectives and improve your workflow and processing capacity.

A LITTLE BIT OF PHYSICS TO BETTER UNDERSTAND

The technique of flotation is based on the physics law of Stokes:

$$v = \frac{D^2 * g}{18\eta} \Delta\rho$$

v = flocs speed
 D = flocs diameter
 g = gravitational acceleration
 η = liquid viscosity
 $\Delta\rho$ = difference of density between liquid and solids

This physics law states that flocs lift to the surface (the speed of flotation) faster when:

- the viscosity of the juice is lower
- the dimension of flocs is bigger
- the difference of density between the flocs and the juice is higher

To increase the speed and the effectiveness of the flotation process, it is necessary to work on floc dimension and density and juice viscosity.



HOW TO INCREASE THE EFFECTIVENESS OF FLOTATION

Quickly reduce juice viscosity

Juice viscosity depends on temperature and pectin content. The addition of a rapid-acting enzyme that can break down pectins and reduce viscosity is necessary before flocculation. **Enartis ZYM RS** contains specific pectolytic activities designed to accelerate and facilitate this process. It is important to remember that time and juice temperature are important for the completion of enzymatic reactions: the higher the temperature, the lower the viscosity and faster the enzymatic reaction.

NB: higher temperature, lower gas solubility.

Depending on grape variety, maturity, pH and acidity of the juice, the dosage of enzyme must be adjusted each year. Performing a simple pectin test is sufficient to determine the addition rate to ensure the complete depectinisation of the juice at a time and temperature more convenient for the winery.

Help the formation of big and light flocs

According to the law of Stokes, the size of the floc particles formed is important: the bigger the floc, the faster it lifts to the surface. For the same law, difference of density between flocs and juice influences the effectiveness of the process. In conclusion, a successful flotation consists of creating large and light flocs capable of rising rapidly to the surface to form the cap. Gas bubbles are used to make the solid particles lighter than the juice and to bring them to the surface while the addition of fining agents (gelatine, pea protein, bentonite and silica sol) can facilitate the formation of large flocs.

Gelatine in liquid solution like **HYDROCLAR 30** and **HYDROCLAR 45** are very convenient in flotation. They do not require any preliminary preparation or dilution and can be dosed as they are. **HYDROCLAR 30** solution, containing 30% of a medium hydrolysed gelatine, is recommended for the flotation of high-quality juice. **HYDROCLAR 45**, a 45% solution obtained from a very hydrolysed gelatine, is recommended when strong removal of phenols is required.



In case of vegetarian- and vegan-friendly wine production, we suggest **PLANTIS AF**. This pure pea protein is very effective for clarifying the juice and forming compact lees. Additionally, it helps to remove iron thus minimising the risk of haze, browning, pinking and loss of aromatics.

Bentonite (**PLUXCOMPACT** or **VITIBEN**) and silica sol (**SIL FLOC**) can be used together with the protein fining to improve clarification, lees compaction and wine protein stability.

Step	Product	Dose	Advantages
Juice from press	Enartis Zym RS	1-2 mL/hL	<ul style="list-style-type: none"> • Reduce juice viscosity • Break down pectin for faster production of floccules
Pre-flotation test	Pectin test		<ul style="list-style-type: none"> • Ensure complete de-pectinisation
	Suspended solids		<ul style="list-style-type: none"> • Good indicator of correct rate of adjuvants
Flotation	Hydroclar 30	20-25 mL/hL	<ul style="list-style-type: none"> • Ensure proper flocculation • Reduce polyphenol content
	Hydroclar 45	7-15 mL/hL	<ul style="list-style-type: none"> • Ensure proper flocculation • Reduce polyphenol content
	Plantis AF	5-15 g/hL	<ul style="list-style-type: none"> • Vegetarian- and vegan-friendly alternative to gelatine • Remove iron
	Pluxcompact or Vitiben	10-20 g/hL	<ul style="list-style-type: none"> • Increase clarity and lees compaction • Improve protein stability
	Sil Floc	20-50 g/hL	<ul style="list-style-type: none"> • Increase clarity and lees compaction • Prevent gelatine over-finishing