Grape processing goes centrifugal

Foodec decanter for grape juice processing and winemaking

Centrifugal separation provides big payoffs

Separation makes a difference

Virtually all types of industrial activity involve separating solids from liquids at some point.

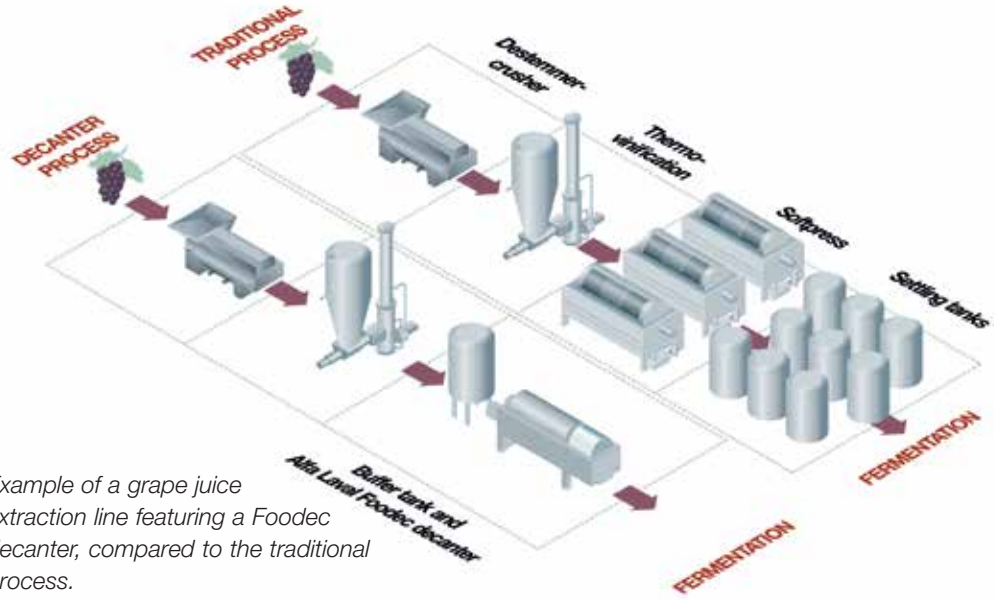
The traditional ways to do this are with different kinds of presses and then filters or settling tanks, in which gravity makes particles, sediment and solids gradually fall to the bottom.

Effective separation makes a bigger difference

Centrifugal separation technology does all this much more effectively – and much faster. A centrifuge is basically a settling tank whose base is wrapped around a centre line. Spinning this unit rapidly means that the effect of gravity is replaced by a centrifugal force – which can be up to 4,000 times more powerful and effective.

Replacing traditional technology with modern centrifugal separation makes it possible to drastically simplify and speed up some of the key processes in modern winemaking, and free up valuable floor space that you can use for other equipment to expand your winery's output and capabilities.

Alfa Laval has more than fifty years of in-depth practical experience in applying different kinds of decanter technology to separation processes in countless different industries worldwide.



Example of a grape juice extraction line featuring a Foodec decanter, compared to the traditional process.
Illustration: Petter Lönegård

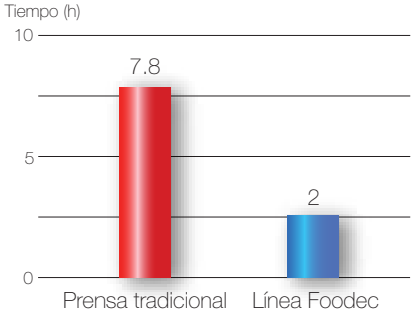
Getting popular in winemaking

The high efficiency of decanters makes it possible to replace traditional presses and clarification equipment. Decanter technology produces a continuous flow with a consistent quality, making it easier to manage. This makes the whole separation process much faster, providing major operating benefits during the all-crucial harvest period.

Foodec-based solutions are thus increasingly becoming the separation equipment of choice in key wine industry processes that include extracting juice from fresh grape mash or after thermovinification.

Decanter separation technology is now also in widespread use for processing the residues from tank bottoms, and for the treatment of wastewater and other undesirable by-products.

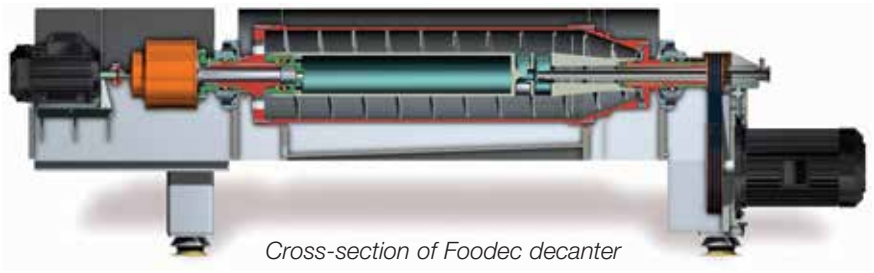
Process time from grape reception to fermentation



2 Foodec decanter in winemaking and grape juice processing

Reliability reduces manpower requirements during harvest
Trivento turned to Alfa Laval to replace a traditional soft press with a Foodec decanter, becoming Argentina's first user of this key separation technology.

"Winemaking equipment must be extremely reliable, because wine production is seasonal and can only take place within a very limited period. Passing the product through filters took time and gave lots of practical problems, with constant maintenance and big staffing requirements. With the Foodec solution, we've been able to substantially reduce the manpower needed for the separation part of winemaking."
Fernando Piottante, Trivento oenologist



Cross-section of Foodec decanter

How a decanter works
A Foodec decanter separates solids from the liquid in one single continuous process, using centrifugal forces thousands of times more powerful than gravity. When the denser solid particles (which in winemaking are mainly grape skins and seeds) are exposed to such forces, they get pressed outwards against the rotating bowl wall, while the less dense liquid (the grape juice) forms a concentric inner layer.

The sediment formed by the solid particles is continuously removed by the screw conveyor, which rotates at a different speed than the bowl. The dry solids then automatically discharge from the bowl.

The clarified liquid phase overflows the dam plates at the opposite end of the bowl, and the grape juice is led away for fermentation.

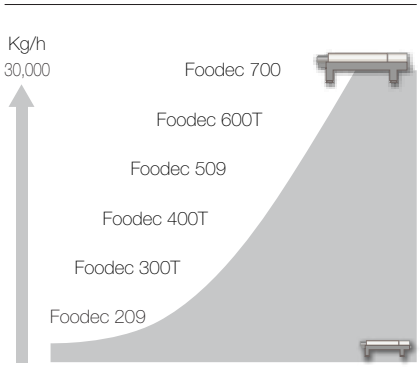
The Foodec advantages
Foodec decanters are designed specifically for separation duties where exceptional hygiene and gentle treatment are essential. This makes them ideal for preserving the quality, aroma and taste of the juice from your grape harvest.

Foodec units are extremely robust, requiring little attention or maintenance. The bowl, conveyor, inlet tube, outlets, cover and other parts in direct contact with the juice are all made of AISI 316L and/or duplex stainless steel. The discharge ports, conveyor flights and feed zone are protected with special abrasion-resistant materials.

Hygiene is also exceptional. The cleaning-in-place (CIP) cycle starts automatically when the decanter stops, to prevent any build-up of unhygienic deposits. This cycle is configured to keep water consumption to a minimum, to save on both supply and disposal costs.

Automatic operation
All Foodec decanters are fitted with the 2Touch control system, with a touch-screen operator interface.

Foodec decanter capacity



Benefits that make good business sense
Foodec decanters provide substantial payoffs in terms of quality, performance and cost-effectiveness.
- Continuous, automated sequences
- High yield and clarification performance
- Exceptional reliability and low maintenance
- Lower operating costs
- Better hygiene.

Three-in-one process doubles efficiency
IIn 2012 Namaqua Wines in South Africa expanded production by installing 4 Foodec decanters capable of processing as much as 60 tons of freshly harvested grapes hourly. Replacing 3 traditional processing stages with 1 continuous, high-efficiency process saved on manpower as well as space, and reduced processing time by 24 hours, enabling Namaqua to recover 20% more juice.

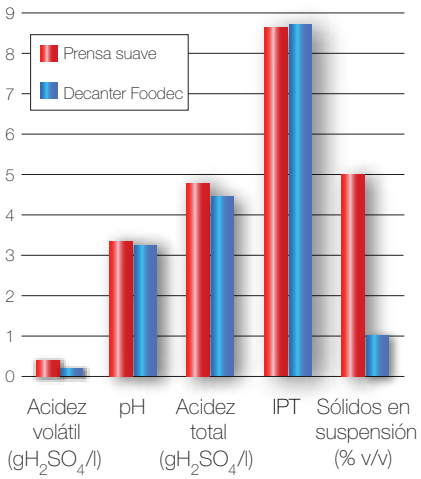
"This juice is consistent in quality, and better than with traditional separation. Alfa Laval decanter technology has fundamentally changed our winemaking set-up."
Len Knoetze, production manager and Reinier van Greunen, winemaker, Namaqua Wines

Grape juice extraction

Efficient, continuous separation
Grapes enter the reception area and the stems are removed. A Foodec unit then separates the juice from the skin and seeds, in only a few seconds. Compared to traditional batch-operation pressing systems, this advanced-technology separation process ensures you a clarified must of consistently high quality and in a continuous flow.

Centrifugal separation gives you better yield by providing high-dryness solids and a clear juice almost free of solids. You benefit from big reductions in lees volume and tank bottom residues, and you don't need to use filtration, flotation or cold settling. This gets your winery's juice to fermentation much quicker.

Quality of grape juice (Sauvignon Blanc)



Three-in-one technology
Centrifugal separation makes it easy to process the incoming grapes, and limits the number of steps needed to prepare the juice for fermentation or evaporation.

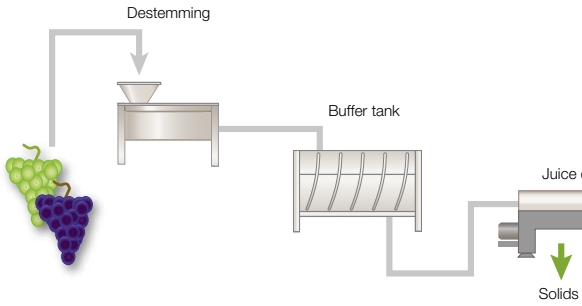
You can eliminate draining, pressing cycles and clarification, paving the way to a more efficient, continuous production flow – and saving on labour costs as well as doing away with space-hogging holding tanks. If you use mechanical harvesting, the de-stemming step can also be eliminated.

Foodec decanter solutions are ideal for white, rosé and red wines when fermentation is carried out in the liquid phase. They are easy to clean, which in turn makes it easy to process different kinds of juice during the same day. They also operate effectively at both low and high temperatures.

Gently does it
With a Foodec solution, you can process the grape inputs gently, avoiding any grinding or abrasion that results in excessive phenols. This enables wineries to recover a high-quality juice that is fully comparable to free-run juice and first presses in terms of pH, conductivity, etc.

Limiting oxidation
For oenologists, it is crucial to restrict oxygen contact during the pre-fermentation phase. The rapid,

Grape juice extraction



effective decanter process allows for easy control of oxygen pick-up and consumption in the juice by blanketing, or by injecting corrective additives.

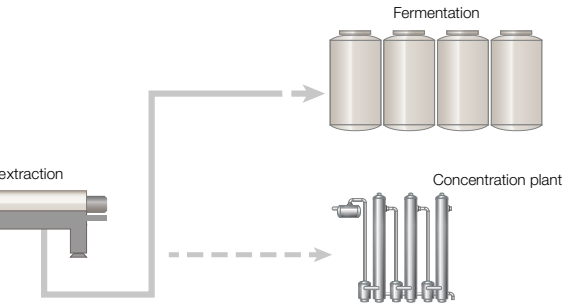
Handling colour extraction
For processes used in making red wine – such as thermovinification – Flash Détente and enzymatic maceration are fundamental for ensuring better extraction of tannins and anthocyanin pigments from the skin to the juice before these are separated. Unlike when using traditional presses, Foodec technology does not result in any loss of colour.

When colour extraction has to be kept at a minimum, as with rosé wine, there are big benefits to be gained from the rapid processing available from Foodec decanters. The colour is adjusted during the previous maceration time and you can control it easily due to the rapid extraction. This results in rosé wine of high quality. This contrasts with traditional presses, where the long cycle has big negative effects on colour extraction.

Boosting quality, strengthening profit margins
Italian winemaker Teanum implemented a thermovinification system featuring heat exchangers and maceration tanks to help boost the quality of its red wines, but quickly ran into problems when the mash was sent to the press. Teanum then decided to bring in Alfa Laval separation technology to tackle the many issues.

"In addition to being able to send the juice directly to fermentation with less than 1% suspended solids, the decanters can also deal with unpredictable inflows during harvest. The units are easy to clean, and I see a lot of profit-boosting advantages in this technology."
Donato Giuliani, Teanum oenologist

Shifting winemaking benchmarks with Foodec technology



Revolution in the winery
When wineries use traditional press separation, they normally seek to achieve the required level of juice clarity by using settling tanks, flotation or filtration aids.

These processes all give rise to problems that include space limitations, flow handling difficulties, high production costs and undesirable environment impacts. The slowness of these separation processes also affects the quality of the final product.

Alfa Laval has therefore developed a patented process to tackle these issues and to make grape juice separation easy, quick and cost-effective, as well as ensuring recovered juice of the very best quality.

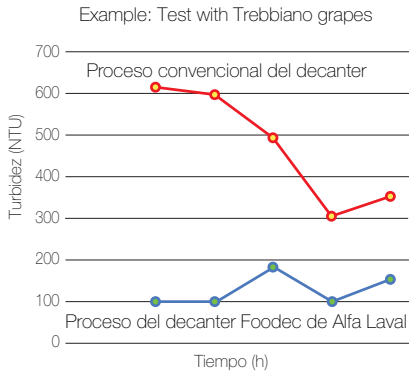
Reducing turbidity
Even though Foodec technology makes it possible to achieve high performance in terms of suspended solids in the grape juice, it is still difficult to manage turbidity resulting from pectin, colloids and fine particles.

To answer winemakers' needs for low-turbidity fermentation, Alfa Laval has developed a complete process designed to achieve a consistently clear juice. This unique process completely eliminates the cumbersome traditional steps and enables winemakers to achieve a clear must with a turbidity of approx. 50–300 NTU (depending on the variety and colour). This is essential for producing wine of high quality.

Patented process
The patented Alfa Laval Foodec centrifuge process features a buffer tank that ensures a consistent, homogeneous flow of mash into the decanter to boost its efficiency.

To achieve low turbidity, the concept is based on the use of enzymatic compounds and clarifier additives directly on the grape mash, just before the separator inlet. These products have been developed exclusively for use with Alfa Laval Foodec decanter technology, and have been approved by the International Organisation of Vine and Wine (OIV).

Clarity of grape juice after extraction



Benefits
- Efficient, continuous processing that is four times faster than traditional press technology
- High solids dryness, boosting juice yield and production volume
- No need for old-fashioned filtration
- Gentle processing of mash, which helps improve wine quality
- Easy-to-manage flow of must, with consistent specifications
- High clarification performance, low turbidity
- Significant reductions in post-fermentation tank-bottom residues
- Up to 40% reductions in operating costs associated with manpower, consumables and utilities
- Reduced environmental impact, using less water and with no need for expensive filter aids.

Cheaper and easier way to deal with filter slurry

Many wineries use earth filters (with diatomite or kieselguhr) for filtering juice or wine. This results in large volumes of effluent that wastewater treatment plants won't accept, plus high disposal costs.

Rabastens Winery in southern France uses Foodec decanter technology to tackle this problem. The slurry, containing 40% suspended solids, passes through a single Foodec unit. This separates it into clarified water, with less than 2% solids, and a dewatered paste. The clean water goes to the local wastewater treatment plant, while the relatively dry paste is spread on local fields, with greatly reduced transport costs.

Foodec decanters everywhere in the winery

Versatile technology, multiple payoffs

Alfa Laval Foodec decanters are used to separate solids and liquids in many of the different steps used in grape juice processing and winemaking:

Clarifying juice

After traditional press extraction, the juice contains lots of suspended solids and must be clarified before it can be fermented. A Foodec decanter reduces the solids load from 5–15% to less than 1–2%.

Recovering juice from tank bottoms

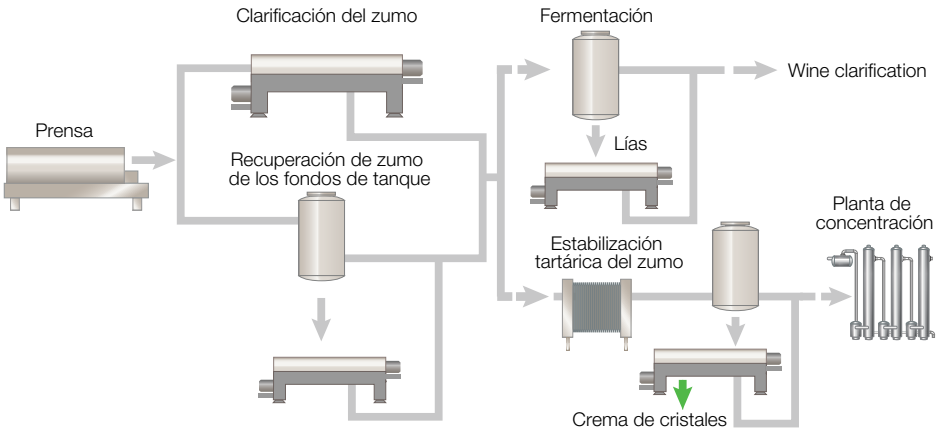
The bottoms of settling tanks normally contain up to 30% of solids, along with potentially valuable grape juice. A decanter can help you recover a maximum of this juice, with only 1–4% of suspended solids, and to concentrate the solids to a very dry paste.

Benefits:

Foodec decanters can be used for many different jobs, and provide interesting business opportunities by opening up new revenue streams and additional income outside the grape harvest period. They also:

- Offer increased value of recovered grape juice and wine
- Reduce the space taken up by bulky tanks
- Save on manpower due to automatic operation
- Cut back consumption of thermal energy, fining agents and filter aids
- Lower operating costs

Multipurpose technology



Recovering more wine from lees

After fermentation, the wine is quickly separated from the residue left in tank bottoms in order to avoid affecting the taste of the wine. A high-efficiency decanter also enables you to recover more revenue-generating wine from the lees.

Separating juice from sulfited lees

In grape juice production, sulphur dioxide is widely used to inhibit oxidation and bacterial or yeast activity. A corrosion-resistant Foodec decanter is the most effective way to recover the juice from the sulfited lees.

Concentrating crystals cream

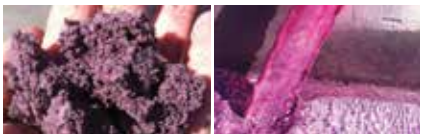
A decanter can separate the material left in the bottoms of the tanks into cleaned grape juice and crystals cream after tartaric stabilization.

Treating water from effluent

Foodec decanters can also be used to reduce the organic matter and solid residue in the effluent from your winery, so it can be disposed of to a wastewater treatment plant.

They also reduce the water content of effluent sludge to cut back on transportation costs, and to separate kieselguhr and other filter aids from the water used in your processes.

The conveyor flights on the decanter are treated with tungsten carbide to make them exceptionally resistant to the abrasion and wear associated with processing *kieselguhr.*



Solids and liquid outlet after separation with Foodec decanter

Service when you need it
You benefit from a global network of technical experts and service centres, with spare parts and service rapidly available even at short notice, to help you avoid difficulties or downtime.

Alfa Laval expert help is available close at hand in all the wine-growing areas of the world, to assist you with installation, commissioning, performance optimization and fault-finding, as well as training, maintenance and service.

Process and engineering – the Alfa Laval advantage

Foodec decanter equipped with accessories and complete control system for grape juice extraction line.

Experience and reach make a difference
Alfa Laval is one of the world's leading suppliers of separation technologies to the food and beverage industries, where exceptional hygiene, reliability and gentle processing are crucial.

Our global reach and financial strength give you reliable access to world-class technology and equipment, with technical support and practical advice that extends over the long term.

We also run a specialist centre focused exclusively on applying Alfa Laval technologies within the wine and grape juice industry, and on sharing its winemaking-related know-how, expertise and practical experience to optimize key processes and equipment performance.

Additional equipment
We can provide a complete grape juice extraction and separation line tailored to your exact requirements, as well as ready-to-use centrifugal separation set-ups based on Foodec equipment.

Our expertise and resources for the winemaking industry mean we can also provide you with a comprehensive range of reliable, compatible additional equipment, such as plate heat exchangers, cross-flow membrane filtration equipment, high-speed centrifuges and bag-in-box fillers.

This helps give you the full benefit of Foodec decanters (and other Alfa Laval equipment), and ensures you easy integration and maximum reliability.

New revenue from other uses
The versatility of Foodec units means you can use the same equipment outside the normal wine harvest season for separation of a wide range of different food products, including olive oil, avocado oil and fruit juices, thereby opening up new revenue streams.

Alfa Laval in brief
Alfa Laval is a leading global provider of specialized products and engineering solutions.
Our equipment, systems and services are dedicated to helping customers to optimize the performance of their processes.
Time and time again.

We help our customers to heat, cool, separate and transport products such as oil, water, chemicals, beverages, foodstuff, starch and pharmaceuticals.
Our worldwide organization works closely with customers in almost 100 countries to help them stay ahead.

How to contact Alfa Laval
Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com

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