

Wineries Recover Higher Value Wine and Juice from Lees

Overview

Recovery of wine and juice from lees is a challenging yet unavoidable task for wineries around the world. The high concentration and variability of the solids makes filtration difficult, however, with the lees comprising up to 10% of a winery's total production volume there is still a high percentage of recoverable wine and juice.

Traditionally lees filtration is performed with rotary vacuum drum (RVD) filters or chamber press filters. While these systems can handle the high solids, the open design allows for high oxygen pick up which can negatively impact the product quality. The recovered wine or juice is often downgraded in value and used in lower-tier blends instead of being added back to the original batch.

The existing technologies can also require high volumes of filter aids like diatomaceous earth (DE) or perlite which increase the wineries' waste generation and disposal requirements, contributing to high operational costs.

The Challenge

With a decreasing global wine surplus, higher prices for bulk wine and increasing competition, wineries are under pressure to increase yield and improve quality. Additionally, with new legislation,

they must also satisfy more stringent environmental and food safety requirements. Accordingly, Pall was challenged with finding an alternate solution to allow wineries to filter lees more efficiently and economically. The new technology needed to provide its users flexibility for treating both juice lees during the demanding harvest period and wine lees during normal cellar processing. The goal was to eliminate the use and disposal of filter aids while reducing oxygen pick up and hence improving the quality of the recovered product.

The Solution

To overcome the drawbacks of RVD and chamber press filters, Pall developed the Oenoflow™ HS system. The new system utilizes microporous membranes that are similar to the hollow fiber membranes that have become the standard in wine clarification applications. The difference with the new Oenoflow HS membranes is that the hollow fibers have a larger internal diameter so that they can process higher solids, up to about 80% by volume. Since filtration is achieved with membranes and without the need for filter aids, operation is more hygienic and does not create DE waste for environmental landfill.

One of the biggest benefits that wineries realize by implementing the Oenoflow HS system is improved



A rotary vacuum drum filter (RVD), the traditional method for recovering wine and juice from lees



A 12-module Oenoflow HS-A system, Pall's new technology for lees filtration

filtrate quality, which results in a higher value of the recovered wine or juice. The recovered wine or juice can be blended back to the original batch instead of being used in lower-tier products. Oenoflow HS is a closed system with minimal oxygen pick up, typically in the range of 0.2 ppm. This is a big improvement when compared to RVD filters, which often have an oxygen pick up of 4-5 ppm or higher. In addition, the microfiltration membranes provide improved and more consistent filtrate clarity compared to an RVD filter or chamber press.

A winery in Australia achieved considerable improvement in filtrate quality after switching from using an RVD filter to the Oenoflow HS system. With the RVD filter, the turbidity of the recovered product was 10 to 15 NTU for white wines and much higher with reds. With the Oenoflow HS system, the filtrate turbidity is consistently less than 1 NTU. In a 5 month period, this winery recovered over 1,000 hectoliters of wine from lees at a value \$168,000 higher than the value that would have been obtained with the RVD filter. This higher value of the recovered wine was the biggest factor in the return on investment for the system, resulting in a short system payback in the order of 1 year.

Flexibility has also proven to be a key attribute of Oenoflow HS system. The system can be used in three different applications. Firstly, the base Oenoflow HS system can be used to recover wine from fermentation and fining lees. Secondly, by adding the Oenoscreen rotary screen filter upstream of the base hollow fiber system, the unit can be used to process must lees during harvest. Finally, when the Oenoflow HS system is not processing lees, it can be used for standard wine clarification duty to increase cellar filtration capacity.

The system can be utilized in different ways to meet the specific needs of each winery. For example, a large global wine company uses a standard hollow fiber wine clarification (Oenoflow XL) system in combination with an Oenoflow HS system to process the complete tank contents of wines after stabilization and a short settling time. The customer uses the XL system to filter about three quarters of the volume in each tank (down to the door) and then uses the HS system for the remaining volume. Processing this way helped both performance of their standard XL clarification system and the overall yield. Their wine clarification system flow rate improved by 15%, and the frequency of chemical cleanings was reduced to once per week. Since the Oenoflow HS system installation, their total recovery has improved now that they can completely empty their tanks. On white wine, their yield improved from 97.1% to 99.15% and on red wine recovery is close to 97%, which is about a 2% improvement. At a winery in Chile, an Oenoflow HS system was purchased primarily for recovery of juice from must lees. The system is utilized as a pre-concentration step for the RVD filter to rapidly recover a portion of their total volume as high quality juice and reduce the volume of lower quality juice recovered using the RVD filter. The winemaker has commented that the juice recovered with the Oenoflow HS system is more aromatic. Finally, another large winery in Australia uses the system in yet another way. This winery uses the HS system to process wine lees in batches as tanks are racked. Then over the weekend the system is used for standard wine clarification duty to supplement their cellar filtration capacity and increase system utilization by about 35%.



Oenoflow HS must lees samples (left: feed, middle: filtrate, right: concentrate)



Oenoflow HS wine lees samples (left: filtrate, right: concentrate)



The Benefits

By implementing the Oenoflow HS system, wineries can recover higher quality wine and juice from lees more efficiently and economically. When using the Oenoflow HS system to replace traditional filter aid based technologies like RVD and chamber press filters, wineries can realize the following benefits:

- Higher quality, higher value recovered wine and juice and consequently a fast return on investment
- No filter aid consumption, handling or disposal complimenting winery sustainability programs
- Higher yields, improved wine and juice recovery
- Flexibility to process fermentation and fining lees, juice lees and post fermentation wine for clarification
- Flexibility to be operated in many ways depending on the specific winery circumstances
- Reduced labor requirements

When coupled with other value added technologies like the Oenoflow XL, Oenofil or Pall Aria™ water treatment systems, Pall can help wineries produce the highest quality products at the lowest possible operating costs.

About Pall Corporation

Pall Corporation is a global filtration, separation and purification leader providing solutions to meet the critical fluid management needs of customers across the broad spectrum of life sciences and industry. We work with our customers to advance health, safety and environmentally responsible technologies.

Pall Food and Beverage provides products and services to ensure product quality and maintain process reliability in beverage and food production. Our solutions also assist in consumer protection, the reduction of operating costs and waste minimization.



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