PALL

Food and Beverage

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Application Bulletin

Increasing the Value of Olive Oil with Pall SUPRApak™ Technology

Overview

The quality of olive oil is dictated in large part by olive varieties and conditions of their growth. The wax content in these oils is a quality attribute of concern, as consumers often prefer bright, clear products at typical storage temperatures. Waxes originate on the skins of olives, and are found in higher amounts in olives grown in hot regions and in olives of certain varieties. These waxes are released into the olive oil during processing.

Waxes form white clumps or haze in olive oil at cooler temperatures, affecting its visual appeal. Waxes also negatively affect flavor profile, masking some of the fruity and spicy flavor notes, which are sought after in premium olive oils.

Olive oil producers are interested in removing the waxes from their oils. They may employ winterization techniques, or various combinations of settling, decanting, centrifugation, and filtration.

The Challenge

Every year, an olive oil producer dealt with a significant volume of high wax oils in their production; such oils commanded only a low market price. About 500 tons of oil fell into this category. The product was stored in tanks for settling, however this approach was insufficient to remove the waxes.

The economic driver for improving the olive oil quality was the potential to command a higher market price if a better quality oil could be produced. The higher market price needed to justify the investment to achieve the required quality.

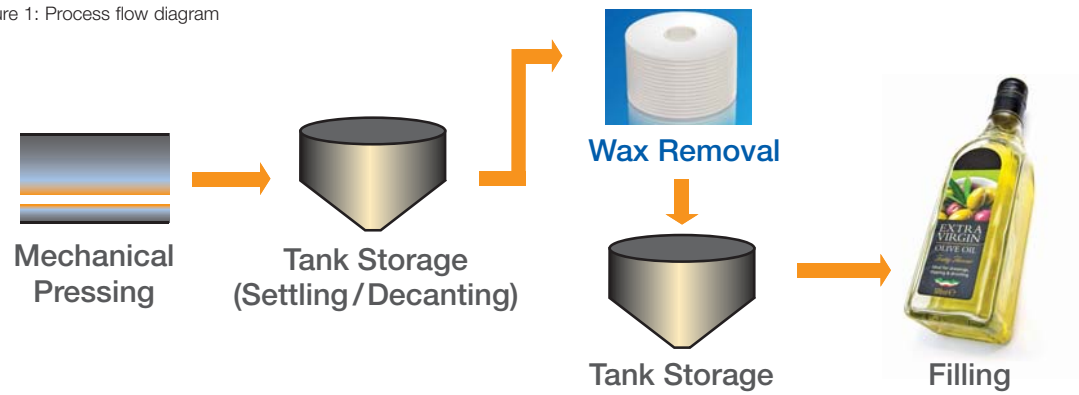
Each SUPRApak SW7700LW module is a dense package of filter sheet material, providing exceptional throughput and excellent filtrate quality.

The technical solution was the reduction of waxes so that when the product was cooled to 12-14 °C (54-57 °F) it remained bright and visually clear.

The Solution

Pall SUPRApak technology provided the solution to this customer's need. By implementing this type of filtration after settling and decantation, the customer realized excellent filtrate quality, which provided a three to four-fold increase in its commercial value.

Figure 1: Process flow diagram



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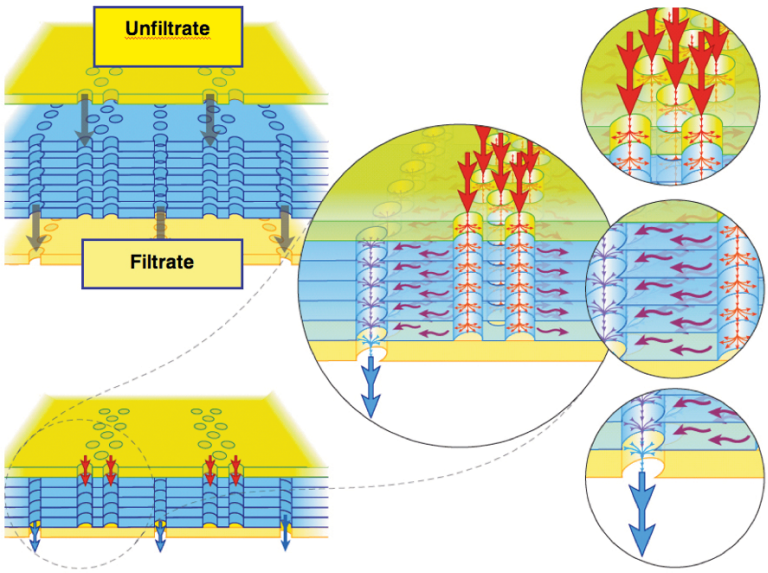
During full scale piloting at the customer's site, Pall's Scientific and Laboratory Services demonstrated successful wax removal, yielding a bright and optically clear product. Figure 1 shows the main process steps used.

Three SUPRApak SW7700LW modules in a 3-high SUPRApak housing processed 32 m^3 (8454 US gal) of olive oil before filter change-out was necessary. Change-out was based on continuous monitoring of filtrate quality, and subsequent chilling of the filtered oil samples showed that the oil maintained its clarity.

adsorptive mechanisms of filtration that normally occur in filter sheet media, resulting in the maximum use of filtration capacity. SUPRApak modules are intended for providing extremely high throughputs especially in continuous production processes.

A SUPRApak module is a dense pack of filter sheet material wrapped around a central permeable core. The sheet material is punched with an intricate pattern of feed and filtrate channels, separate from one another, which direct the flow of the fluid through the entire filter package. The

Figure 2: Schematic representation of SUPRApak module with edge flow filtration mechanism



For an illustration of the flow path of fluids in a SUPRApak module, *click here*.

The capacity of the SUPRApak modules is influenced by several factors, including type of olive oil, upstream treatment of the oil prior to wax removal, process temperature, and the required filtrate quality. Field experiences have shown capacities up to 62 m^3 (16,380 US gal) per module.

SUPRApak SW7700LW modules are manufactured using a filtration matrix uniquely suited to wax removal. While also effective in removing coarse particles over approximately 15 microns[1], the key benefit is the clarification of the oil due to the wax removal. While SUPRApak modules are not targeted to handle high suspended solids loads in olive oil production, they provide highly effective trap and polishing filtration.

The modules are installed in a fully enclosed, low hold-up volume housing, which provides additional product protection by limiting exposure to light and air. There are minimal product losses, and pressurization of the assembly at the end of filtration further increases product yield.

The unique performance of SUPRApak modules is due to an entirely new flow configuration called "edge flow", shown in Figure 2. This edge flow principle maximizes the surface, depth and driving force of differential pressure pushes the fluid from the feed channels (red arrows) through the sheet media parallel to the sheet surface (purple arrows), toward the filtrate channels. The filtrate channels (blue arrows) then carry the fluid toward the center core where it exits the module.

SUPRApak SW7700LW modules can be stacked from one to six high in one filter housing, providing an extremely compact footprint of approximately 0.5 m^2 (5.4 ft^2), representing approximately 8-50 m^2 (86-538 ft^2) of filtration area.

The SUPRApak housing is fully enclosed, available in modular configurations, and available with a complete accessory package for easy installation into existing pipework.

[1]Removal performance of sheet-based products is highly dependent on process conditions and flux rates used.

The Benefits

Olive oil producers can achieve effective wax removal to improve the quality and market price of their oil. Excellent filtrate quality, coupled with many additional benefits, enabled the customer to satisfy their production goals.

- Enclosed system for product protection
- High product yield
- High throughput at low investment cost
- Low labor, maintenance, and downtime costs
- Extremely low installation footprint
- Easy integration into existing system

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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