Food & beverage

Preserving the purity of olive oil

Extra virgin olive oils are renowned for their superior quality. However, olive oil producers face the challenges of vegetative water and particles that lead to turbidity and a reduced shelf-life. One producer found a filtration solution for the problem.

The premium virgin olive oil brand ORO BAILÉN is produced by Spanish company Aceites Oro Bailén Galgón 99, S.L.U. and it decided to tackle the challenge of vegetative water and particles so that it could create and preserve one of the best olive oils in the world. Together with Eaton Filtration, it chose BECOPAD premium depth filter sheets made of high-purity cellulose without the addition of mineral components to increase flow rates and retain impurities.

Extra virgin olive oils (EVOOs) are the highest quality products in the olive oil range, and the top location for their production is Jaen, the northern gateway to Andalucía, in Spain. EVOOs that come from this region are renowned as some of the best in the world. The superior quality of these high-class extra virgin olive oils comes from an early harvest. This is when the olive fruit is at its ideal ripeness to provide the best attributes in an olive oil.

The Galvez-González family started their olive oil business in 1999. Aceites Oro Bailén Galgón 99, stands out among EVOO producers and is widely recognised for its ORO BAILÉN brand, which has received many international awards. The company produces about 300,000 bottles per year of its premium quality brand which includes the four different monovarietal EVOOs, called Picual, Arbequina, Frantoio and Hojiblanca.

The quality of high-class extra virgin olive oils comes from an early harvest, when the olive fruit is at its ideal ripeness to provide the best attributes in an olive oil.

The company takes pride in the quality of its high-class olive oils, especially their appearance and their fruity and aromatic flavours.

The process

All high quality EVOO productions begin by strictly monitoring the olive trees in the field. Early harvested EVOO is the first and richest olive oil. When harvest time comes, around the second half of October, olive oil production starts with pressing the olive fruits, followed by a cold beating process, centrifugation, a brief storage period and then a filtration process to remove impurities. The early harvested EVOO is the most difficult to filter. The filtration process has the potential to significantly alter the EVOO yield and organoleptic profile. Low yields affect the production capacity and the profitability for olive oil producers.

Early harvested EVOO characteristics are highly sensitive to impurities. Their appearance, taste and shelf-life all depend upon the effectiveness of the filtration processes. Filtration should remove all traces of water and particles to enhance the quality of the bottled product. These contaminants not only affect the immediate appearance, aroma and flavour of the oil, they also promote enzyme reactions that reduce the EVOO shelf-life and negatively influence its most admired characteristics by creating off-flavour reactions.

Even a 0.2% water content in the finished product diminishes its appearance. It causes turbidity in the EVOO, making it less appealing to the connoisseur of olive oils. Small particles and water also affect aroma and taste as they lower the fruity and pungency expression in the oil. Water stimulates enzyme actions that degrade C6 aldehydes, which are responsible for the "green" aroma of premier EVOOs. Additionally, it is important to the producer of EVOO that no valuable oil is lost during the filtration process.

Correct filter media

Filter media used for filtering olive oil in a two-step filtration process are generally filter sheets of pure cellulose fibre, with or without mineral components (diatomaceous earth) due to their excellent clarification performance. The filtration mechanisms in the depth filter sheet are both mechanical and adsorptive. Particles and microorganisms are mechanically retained on the surface and in the inner hollow space structure of the filter media. Due to the asymmetric pore structure, large particles are retained on the surface, and small particles in the tighter spaces inside. Particles that are significantly smaller than the pore structure will also be retained by adsorption on the inside.

BECOPAD depth filter sheets are made of high-purity cellulose fibres and do not rely on mineral components such as diatomaceous earth.

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Due to the composition of the depth filter sheets with mineral components, they retain a certain amount of oil resulting in loss of valuable olive oil inside the matrix of the filter media. In addition, they can also remove valuable aroma components due to their higher adsorption effect. Early harvested EVOO is a specialised product with high demand and limited availability. Finding the right media capable to combine the strictest standards of microbiological safety while maintaining the valuable colours, flavours and aromas of the EVOO was the challenge that was addressed by Aceites Oro Bailén Galgón 99, along with the Eaton team of filtration specialists.

Filter solution

Eaton has been working with the company since it began, over 20 years ago, especially in the area of filtration technology. For this particular challenge, Eaton proposed the use of Becopad 550 premium depth filter sheets made of high-purity cellulose because of their excellent performance. Working with the Spanish distributor, Agrovin, Eaton technical specialists explained this filter technology and conducted trials on site. As soon as the results became evident, the solution was adopted and has been in place ever since.

Becopad depth filter sheets are made of high-purity cellulose fibres and do not rely on mineral components such as diatomaceous earth. The type of filter used to produce the premier extra virgin olive oil is the Becopad 550, which comes in sheets of 23.6 x 24.2 in (600 x 615 mm). The fibres form a special cellulose matrix with a retention range of 2 to 3 microns. The resulting high filtration performance allows these depth filter sheets to remove up to 100% of vegetative water from the EVOO. In this application the depth filter sheets are designed to offer excellent performance, even in the most challenging context of the early harvest period.

The Eaton solution is also very efficient for particle removal. With no added mineral components these depth filter sheets have low charge-related adsorption. As a result, valuable aroma components and colour remain in the product. Due to the characteristics of the cellulose matrix, particles are reliably separated by mechanical depth filtration and therefore do not affect the quality of the EVOO.

Service life

With regards to managing filter sheets and service life, Becopad depth filter sheets offer additional advantages in olive oil filtration. Usually, the operator has to check regularly through the filtration gauge viewer to see if the olive oil is cloudy. With these depth filter sheets, differential pressure can be used as turbidity is retained until a ΔP of approximately 21.8 to 29 psi (1.5 to 2.0 bar) is reached. This is when the depth filter sheet is saturated and, due to the increased differential pressure, water is not retained anymore. In olive oil filtration the flow rate will then decrease significantly when the saturation point of these depth filter sheets is reached. Operators will easily perceive the proximity of saturation point by checking the differential pressure and seeing the decrease of the flow rate.

Monovarietal extra virgin olive oils of the premium quality brand ORO BAILÉN.

Aceites Oro Bailén Galgón 99, implemented the Becopad 550 solution for its premier brand production line and found that Becopad is the best choice for this specialised application. Using 100 Becopad depth filter sheets, 23.6 x 24.2 in (600 x 615 mm) in size, allows the company to increase the filtration volume of its early harvested EVOOs to up to 4.9 gal/ft² (200 l/m²) in one batch. Thus, it can achieve approximately 30% longer filter service life compared to standard depth filter sheets. Additionally, a higher production yield was achieved by reducing drip losses and decreasing the amount of oil remaining in the filter sheets after filtration. All these results are dependent on the olive fruit varietal, the pre-filtered product characteristics and the filtration temperature.

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José Miguel Sabalete, quality manager at Aceites Oro Bailén Galgón 99, said: "All our extra virgin olive oil produced under the brand name ORO BAILÉN comes from our olive groves. Our oils are made 100% from the Picual, Arbequina, Frantoio and Hojiblanca olive varieties. Their singular and peculiar fruity and aromatic notes give them a very marked personality, but without any doubt the most outstanding quality is their harmony, a perfect conjunction between fruity, bitter and spicy. Becopad 550 is the most suitable technology that offers maximum respect to the quality attributes of our rare and unique EVOOs, one of the most awarded brands in the world." ●

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