EDIBLE OILS & BIODIESEL PURIFICATION
MAXIMIZE YOUR YIELDS THROUGH FILTRATION

Celite® Filter Aids
ROBUST AND EFFICIENT FILTRATION

MAXIMIZE YIELDS Celite filter aids have been used in vegetable oil and animal fat filtration for decades. Filter aids are used in these filtrations because they deliver high throughput and high yield beyond any other technology for purification.

The new Celite filter aids are specifically developed for edible oils and biodiesel. You will realize faster filtration and increased oil recovery. Celite filter aids can be used in all stages of edible oil and biodiesel filtration to maximize your product yield and improve quality.

FILTRATION

Robust filtration

Filter aid filtration is widely believed to be the most robust technology for difficult filtrations, like biodiesel and edible oils, where high solids loading combined with viscous and variable feedstocks are the standard. Advantages of filter aids include:

- Versatility
- High clarity results
- High throughput
- Simple scale-up from bench-scale to production-scale
- Lowest cost filtration technology

DEWATERING

Removes water as it filters

All diatomite filter aids dewater while they filter. Their nanopores (Figure 2) and hydrophilic surfaces are ideal for absorbing trace amounts of water in oils.

WINTERIZATION AND DEWAXING

A filter aid designed for winterization and dewaxing

Oils with high wax content are increasingly used to lower feedstock costs. To remove this excess wax, Celite 545 VO diatomite filter aid was developed to perform winterization and dewaxing, through extensive testing in sub-zero climates. When added at the beginning of the winterization process it “seeds” the wax crystals, increasing their number and size (larger crystals are easier to filter). After forming the crystals, Celite 545 VO then acts as a filter aid, to remove wax from the oil. When winterization is not needed, Celite 545 VO dewaxes the feedstock by filtering out waxes at ambient temperatures.

Because winterization is performed at cold temperatures (i.e., high viscosity) a coarse filter aid is required. Whether winterizing or simply dewaxing, it is essential to have a filter aid that does not react with waxes. Many filter aids have a tendency to react with waxes and other substances to form a glue-like substance which makes filter cleaning difficult. Celite 545 VO meets both these requirements.
FILTER AIDS AND BIODIESEL & EDIBLE OIL

A perfect match

While much of the focus on biodiesel and edible oil filtration is on post-production, filtration challenges start with feedstock variability. Unlike cartridge filtration and centrifuges, filter aids are extremely efficient at each step of oil filtration, including filtration of used fryer oil, tallow, and other recycled oils prior to biodiesel or edible oil production.

Filter aid filtration has been used in edible oil filtration since the early 1900s. It continues to be a robust method of separation technology for compressible solids (e.g., gums and waxes), especially when feedstock solids loading is greater than 1%. The advantages include high solids capacity, low cost and ease of scale-up.¹

The uniqueness of filter aid filtration lies in the suspension of filter aid (e.g., diatomite) in the feedstock during filtration. It can be contrasted with dead end (e.g., cartridge) filtration in which the filter media is immobilized in a filter. When suspended in the feedstock, diatomite is called “body-feed.”

The body-feed deposits diatomite alongside the compressible (e.g., waxes and gums) or unfilterable (e.g., bleaching clays) solids throughout filtration. The rigid and porous diatomite particles prevent the waxes, gums and clays from forming an impermeable mass (Figure 3b), which is what gives filter aid filtration its extraordinary solids holding capacity and speed. This body-feed also continuously regenerates the filter surface. Without body-feed, impermeable debris accumulates within finite flow channels. The result is a rapid pressure rise and the requirement for greater filtration surface area (Figure 3a).

Versatile

Celite filter aids allow you to apply a single filtration strategy to the entire plant, and multiple feedstocks. Other separation methods (e.g., centrifuges, coalescers) limit processing flexibility; as you change feedstocks these other technologies can produce inconsistent results.⁵ Celite filter aids allow you to achieve similar results regardless of the feedstock or the plant design.

Economical

The use of Celite diatomite filter aids can reduce dry washing reagent usage by 50% in some cases.⁶ Celite filter aids are natural silica and their glass-like chemistry is compatible with two of the most common problems in biodiesel and edible oil filtration:
- Alcohols, water and methyl esters (problematic for pleated paper filters)
- Hydrocarbons (absorbed by polypropylene filters, shortening filtration life)
OIL FILTRATION | How filter aid works

**PROVEN TECHNOLOGY** IMERYS IS THE LARGEST GLOBAL PRODUCER OF MINERALS FOR FILTRATION. AS THE LEADERS IN DIATOMITE INNOVATION AND QUALITY SYSTEMS FOR ALMOST 100 YEARS, WE INVESTED OVER 50 MILLION DOLLARS IN OUR FLAGSHIP DIATOMITE PLANT IN 2008. OUR HIGH PERFORMANCE FILTER AIDS INCLUDE DIATOMITE, PERLITE AND CELLULOSE PRODUCTS.

**TECHNICAL SUPPORT**
Whether it is troubleshooting a problem or choosing the filter aid most suitable for your biodiesel or edible oils production, our trained representatives are a source of support and ideas. Please contact us for a filtration review of your facility. We’ll provide suggestions on how to optimize filtration of your biodiesel and edible oils. Contact your local representative or email: biodiesel@worldminerals.com.

**REFERENCES**

FILTER AIDS | For biodiesel and edible oils

<table>
<thead>
<tr>
<th>PRODUCTS</th>
<th>PRODUCING LOCATION</th>
<th>APPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Celite Hyflo</td>
<td>Lompoc, CA, USA</td>
<td>Filtration, general</td>
</tr>
<tr>
<td>Super-Cel®</td>
<td></td>
<td>Dewatering</td>
</tr>
<tr>
<td>Celite® 545 VO</td>
<td>Alicante, Spain</td>
<td>Filtration: winterization or dewatering</td>
</tr>
<tr>
<td></td>
<td>Quincy, WA, USA</td>
<td>Dewatering</td>
</tr>
</tbody>
</table>

The physical properties of the products represent typical values obtained in accordance with Imerys test methods and are subject to manufacturing variations. They are provided here as a general reference only, are subject to change without notice, and should not be relied on for any particular application.

To request a filtration audit, please contact our filtration experts at FiltrationHelp@imerys.com.