

# FOOD PROCESSING

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## Fats & Oils - Naturally!

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# High-Oleic Food Oils Are Getting Noticed

As consumers accept some fats are good, high-oleic oils – from canola, sunflower, safflower, soybean, algae and olive oil – have won an FDA health claim.

By Food Processing

Just as the large, golden blooms of a sunflower pivot to follow the sun (a phenomenon called heliotropism), food manufacturers similarly find themselves striving to stay on the sunny side of consumers, who continue to up their demands for healthier, sustainable and traceable ingredients.

Recently, high-oleic oils increased their luster when, in November of last year, the FDA authorized a qualified health claim relating consumption of these oils to a reduced risk of heart disease.

The following wording will be allowed by FDA as a package claim: “Supportive but not conclusive scientific evidence suggests that daily consumption of about 1½ table-spoons (20g) of oils containing high levels

of oleic acid [at least 70%], may reduce the risk of coronary heart disease.”

The variety of oils that would be eligible for this health claim includes high-oleic canola, high-oleic sunflower, high-oleic safflower, high-oleic soybean oil, high-oleic algal oil and olive oil. High-oleic soybean oil was not on the original FDA list but also qualifies for the claim, according to the United Soybean Board.

“The soybean industry was in the beginning stages of building the market for high-oleic soybean oil when the petition was created,” explains a spokesperson for the board ([unitedsoybean.org](http://unitedsoybean.org)). “With its December 2017 global approval, the [soybean] industry is committed to producing 9 billion pounds of U.S.-grown high-oleic soybean oil by

A high-oleic oil is any oil high in monounsaturated fats. Each of the aforementioned oils has a high level of monounsaturated fats but varying levels of polyunsaturated fats—the more the polyunsaturated content, the lower the shelf stability.

2027, and high-oleic soybeans are on track to be the fourth largest row crop by 2024.”

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In terms of global consumption, palm oil is the clear leader, although it's not widely used in the U.S. and Canada. Soybean oil still leads in these parts, and it's catching up to palm oil on the global stage.

When performance is comparable, price is certainly a consideration. However, will price tip the scale when labeling concerns include the goal of claiming a product is GMO free? For example, while canola oil might pose a lower price point than sunflower, non-GMO canola oil is a fraction of the overall supply. This is equally true for soybean oil. Sunflower and safflower oils

are naturally 100 percent GMO free, offering a potential marketing advantage.

### **LOOKING ON THE SUNNY SIDE**

Sunflowers belong to the largest family of flowering plants while safflower is closely related to thistles. Sunflowers are not the only plants that follow the sun but might be the most obvious due to their large flower.

“The sunflower's big, central head was caused by human selection; it happens very infrequently in the wild,” said Brent Hulke, research geneticist for USDA Agricultural Research Service in Fargo, N.D. Its development was a trait encouraged by native American breeders. “This increased the yield and made the plants more manageable.”

Naturally sunflowers can be divided into the oilseed and non-oilseed varieties. “Non-oil types have more carbs and protein to make up for the lack of oil,” said Hulke, while the oilseed type might contain as much as 50 percent of its seed weight in oil.

South and North Dakota lead the nation in terms of sunflower production. Currently 80 percent of the crop is sold and consumed domestically, partly due to the current trade situation. Last year's production was 9 percent above 2017 totals, and farmers are expected to increase their plantings for 2019. Sunflower oil is available in quantities from a jug to tanker.

In terms of application use and performance, according to John Sandbakken, executive director of the National Sunflower Assn. ([www.sunflowernsa.com](http://www.sunflowernsa.com)), high-oleic sunflower oil finds its use in food manufacturing primarily for par-fried snacks like potato chips or corn chips. It is also used in some sauces, marinades and dressings, vegetarian meals, as spray coatings for cereal, crackers and dried fruits and in some bakery products.

The smoke point for sunflower oil is approximately 450°F for “an excellent fry life.” Its low linoleic acid content provides a longer shelf life as well. “Off flavors and odors are not a problem,” said Sandbakken, “and with that neutral taste, the seasonings and flavorings can really shine in the end product.”

Pricewise, Sandbakken says canola is similar to sunflower oil in terms of price. He claims a longer fry life for sunflower when compared to canola “and when looking at the economics of it, how long does that oil last

in the fryer?” According to the sunflower association, the high-oleic variety supplies a fry time of approximately 20 hours. An experimental sunflower oil, currently unavailable, demonstrated a 23-hour fry life during testing.

“Obviously product porosity will affect fry life,” said Sandbakken. “The more porous the product, the more oil it will absorb, and this would shorten fry time or fry life. A Cheeto, for example, as a more porous product than a chip, would be a high-absorption application.

“Something everybody is looking for is clean labels,” Sandbakken continues. “Consumers want to eat healthier and the fact that 100 percent of the sunflower crop is non-GMO assured, no matter where they buy their sunflower, gives us a strong advantage.”

## **COMPETITIVE CANOLA**

The various oils in their high-oleic form offer advantages or benefits for food manufacturers compared to their traditional versions. High-oleic canola oil offers a high heat tolerance, more stability and a longer shelf life compared to regular canola oil, according to Angela Dansby, communications director for the U.S. Canola Assn. ([www.uscanola.com](http://www.uscanola.com)). High-oleic canola oil offers higher heat tolerance, more stability and a longer shelf life compared to regular canola oil.

## Among comparable products, canola oil has the least unhealthy saturated fat and most heart-smart omega-3 content of all common edible oils.

Dansby says canola oil is used in applications ranging from granola bars to potato chips. “Its neutral taste and light texture make it idea for virtually all food products unless a distinctive oil flavor is desired.”

Compared to sunflower oil, the smoke point for regular canola is slightly higher, 468°F. “If a longer shelf life is required,” she says, “then high-oleic canola oil is even better as its higher content of monounsaturated fat makes it more shelf stable with a slightly higher smoke point (475°F).” High-oleic canola oil is only available to the commercial food sector.

Among comparable products, canola oil has the least unhealthy saturated fat and most heart-smart omega-3 content of all common edible oils. “In fact, FDA authorized a qualified health claim in 2006 about canola oil’s ability to reduce the risk of heart disease when used in place of unsaturated fat,” said Dansby.

Also, according to Dansby, canola oil is available in greater abundance and can beat sunflower and safflower oils on price.

Most canola grown in North America comes from “biotech, herbicide-resistant varieties because they are superior to other varieties in controlling weeds. Not that oil made from biotech varieties is different than that made from non-GMO varieties in terms of safety or quality.” She adds, “Biotech traits are not detectable in oils anyway as they are conferred via protein and oil is 100 percent fat.”

Overall, in terms of staying on the sunny side of a healthy diet, Dansby noted the Dietary Guidelines for Americans recommends liquid vegetable oils in place of saturated fats to help consumers stay below the 10 percent daily intake of saturated fat. While canola oil is recommended in the guidelines as a healthy choice, any of the varieties listed as a high-oleic variety would be a valid choice as well.



# The Elegance of Expeller Pressed

By Bunge

Simply put: today's consumers want food, simply. Shoppers are choosing products with fewer ingredients, products with fewer artificial ingredients, and products that are closer to the fresh foods they know. People didn't come out of the recession penny-pinchers, but they did come out demanding more value from every product.

Correspondingly, more and more restaurants and food formulators are asking for artisan oils—those that carry the premium expeller pressed, cold pressed, or virgin label. People associate these attributes with quality, and, with more discretionary income in their pockets, they aren't afraid to indulge in good value from trustworthy companies that bring passion into crafting their finished products. Beyond the demand for a tasteful, finished oil product, there's another driver behind the growth in the expeller pressed oil market: consumers see the brands they support as extensions of

themselves. This is particularly true of the social media-savvy millennial generation (ages 19-35).

Shopping for food or visiting a favorite restaurant with friends and family is about quality nourishment, but it's also a reflection of values. One of those values is "authenticity"—namely, reconnecting to origins, to what got us here, to what will last. One answer to that call for authenticity is the expeller press, which is deeply ingrained in America's agricultural heritage. Consumers want to be a part of that.

## THE EXPELLER PRESS: AN AMERICAN INVENTION

America is a country where we make things, elegant things: the cotton gin, the steam engine, the tractor, and rubber tires. In 1876, an enterprising young man from Ohio saw a paper printing press at the Chicago Centennial Exposition. His name was Valerius Anderson, and 10



years later he would go on to invent the world's first continuous screw expeller press to extract oil from crop seeds.

The expeller press was incredibly successful: in the early 1900s, 60 to 80 percent of the soybean crush was done this way. It was the most efficient method at the time, recovering up to 70 percent of the oil.

Then, in 1941, Germany invented a new method for extracting oil from seeds using solvents. Solvent extraction is more efficient than expeller, yielding up to 99 percent of the oil, and can operate at higher capacities. But like bell-bottoms and baseball season, good things come back around.

The sales of expeller pressed cooking oils have jumped nearly 300 percent since 2011, according to Nielsen data. Consumers associate the expeller pressed label with premium products, and there's a high correlation between expeller pressed oils and oils that are also labeled non-GMO. With discretionary spending on the rise, consumers are demanding premium products—like expeller pressed oils and oil ingredients—and are increasingly able to pay for them.

## EXPELLER PRESSED OIL TODAY

Consumers who buy expeller pressed oils appreciate coming home with a product that's more gently processed, and one that may retain more of the delicate

flavor and fatty acids of the original oilseeds. Three out of four consumers read the ingredient and nutrition panels of the foods they buy, and with a world of information at their fingertips, they know more about food ingredients and manufacturing than at any time in history.

Livestock farmers have also been enjoying the benefits of expeller press methods: the meal left behind after the oilseeds are pressed has a higher fat and protein content and is highly desired for the cow-calf and similar feed markets. Sunflower meal after mechanical pressing has a fat content of 13 percent—versus after-solvent extraction, where it may have fat content of only 1 percent, according to the National Sunflower Association.

Whole Harvest was the first company to offer an expeller pressed line of culinary oils for commercial applications (WholeHarvest.com), and was acquired by Bunge. “We see more of our customers asking for the expeller pressed label or looking for minimally processed oils,” says Brian Anderson of Bunge. “So we're really pleased to expand our capacity to provide expeller pressed oils and, in turn, to bring our expertise and extensive network and logistics capacity to Whole Harvest products.”



Download the complete white paper **here**.



# U.S.-Grown Soybean Shortenings Are Proven Solutions for Bakery Applications

By Qualisoy

**S**oybean shortenings, including high oleic soybean and conventional soybean shortening, outperform most other high-stability options in bakery applications such as puff pastries, pie crusts, icings, donuts, cakes and cookies.

Functionality and sensory tests, conducted in partnership with Stratas Foods, demonstrate that soybean shortenings are a superior solution for food manufacturers seeking a U.S.-grown, sustainable oil solution that does not compromise functionality, product quality or taste. Produced by interesterification, high oleic and conventional soybean shortenings provide comparable, and in some cases, improved functionality to partially hydrogenated oils in products that require solid and semi-solid shortenings.

## **PUFF PASTRY: THE NEW GOLD STANDARD**

Soy-based baker's margarine, a new ingredient which will soon be introduced to the market, is formulated with high oleic soybean oil, conventional soybean oil or combinations of both, and outperforms palm and partially hydrogenated oil in puff pastry applications in terms of finished bake height and structure, as well as desired honeycomb texture, which adds to overall likeability. The soy baker's margarine performs on par with butter, which is considered the "gold standard" for puff pastry. This is in part due to the shortening's wide working temperature range, excellent melting properties and general ease of workability.

## **ICING: MORE VOLUME, MORE VALUE**

High oleic soybean shortening incorporates air faster than a standard partially hydrogenated oil or palm shortening, allowing bakers to add up to 50% more water and thereby increase the volume of the icing. This means more cakes can be frosted with less product, an economic win for bakers. Icing made with high oleic soybean shortening is smooth and light – ideal for decorating. It also freezes, thaws and holds colors well. High oleic soybean shortening performs well over a wide temperature range, while palm oil is difficult to work with in both warmer or cooler temperatures.

## **PIE CRUST: OPTIMAL TEXTURE**

High oleic soybean shortening performs as well or better than partially hydrogenated oils, and outperforms palm-based shortenings and lard in all pie dough evaluations, including firmness, flakiness, height and temperature workability. Dough made with high oleic soybean shortening also proved to be versatile, performing equally well under both hand-rolling and a pie press, resulting in an evenly browned crust.

## **DONUTS: TOP-RATED FRY LIFE**

Cake and yeast-raised donut deep frying studies comparing partially hydrogenated soybean oil (approximately 31% trans fat), a palm/soy blend, conventional

soybean shortening and high oleic soybean shortening prove that donut fry shortening made with high oleic soybean shortening performs similarly to traditional shortenings made with partially hydrogenated oils and offers a longer fry life compared to other oils. The study also revealed that donut color, spreadability and height are comparable to donuts made with partially hydrogenated oils.

## **COOKIE DOUGH & CAKE: A DROP-IN SOLUTION**

A 12-month shelf life study evaluated the oxidative stability, application review and texture analysis of high oleic soybean shortening, conventional soybean shortening, partially hydrogenated shortening and palm bakery shortenings in white cake and sugar cookie applications. High oleic soybean shortening results in a softer, more tender cookie than those made with other high-stability shortenings. Cakes made with high oleic soybean shortening have a favorable dome height, texture and mouthfeel, according to trained food scientists.

Visit [Qualisoy.com](http://Qualisoy.com) to request your free sample of high oleic soybean oil and shortening or to speak with an oils consultant today.



Download the complete white paper **here**.



# Improve Your Waste Grease Recycling Process With DSI

By Pick Heaters Inc.

**B**rown grease – composed of fats, oils, and grease (FOG) and rotting food – has long been a problem for restaurants, food service operations and commercial kitchens. Brown grease can clog sewer lines and interfere with septic systems and sewage treatment operations, so restaurants install grease traps or gravity interceptors to collect it from kitchen sinks and floor drains for later disposal.

Most brown grease from waste traps has historically ended up as landfill, but recognition of its value for production of fertilizer, biodiesel and other products, as well as more stringent EPA regulations, are driving a trend of brown grease recycling.

## CHALLENGES OF RECYCLING WASTE TRAP GREASE

The unprocessed grease is a viscous slurry, with a typical solid content of 7% to 10%. It must be heated to reduce the viscosity and allow the components to be separated, but the heating of viscous slurries is a difficult task. Challenges include plugging, fouling and inconsistent heating. Direct steam injection (DSI) is a great choice for this

demanding application due to its high energy efficiency and ease of use compared to indirect heating methods.

Figure 1 shows a DSI-based system for processing waste-trap grease. A progressive cavity pump is used to transfer the brown grease from the holding tank. This type of pump is preferred for high-viscosity slurries because its mechanical and volumetric efficiency increases as

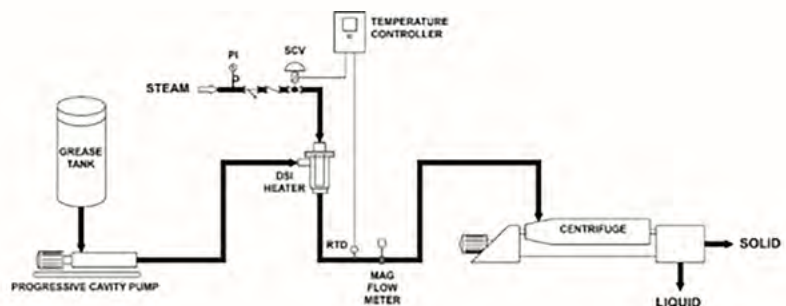


Figure 1. A brown grease processing system based around the DSI heater. Source: Pick Heaters

does the viscosity; in contrast, a centrifugal pump becomes less efficient with increasing viscosity. The flow rate of the progressive cavity pump also remains relatively constant with variations in viscosity.

The slurry then passes to the DSI Heater, that heats it instantly from a nominal 60°F to 180°F. The heater must provide consistent heating of the slurry using medium to high-pressure steam and a liquid pressure of approximately 20 PSIG.

An electronic temperature controller monitors

the discharge temperature via a resistance-temperature detector (RTD) and regulates a steam control valve to maintain the desired 180°F setpoint temperature.

Finally, the heated slurry is sent to a decanter centrifuge to separate solids, light liquids such as oils and heavy liquids like wastewater.

### THE ABCS OF DSI

A DSI Heater injects steam directly into the fluid for an efficient transfer of heat – 100% of the available energy from the steam is instantly absorbed by the liquid.

The tremendous amount of energy available in the steam makes it imperative that the energy be dissipated quickly into the fluid to maintain stability. Failure to dissipate and condense the steam inside the mixing chamber can lead to inconsistent temperatures and potentially severe steam hammer.

An Advanced-Design type DSI Heater disperses the steam in many fine streams through precisely arranged orifices, promoting rapid mixing and instantaneous heat transfer. As the steam enters the internal injection tube it acts against a spring-loaded piston to expose some or all of the orifice pattern. As the steam input varies due to load changes, the piston adjusts the number of exposed orifices, providing rapid response to process changes.



**Figure 2. Advanced-Design type DSI heater allows for rapid mixing and instantaneous heat transfer. Source: Pick Heaters**



Download the complete white paper [here](#).





# Sanitary Filter Housings

By Rosedale Products

**R**osedale Products Inc. is a leading technology developer in the field of liquid filtration systems and waste minimization products for customers around the globe. With more than 50 years of experience, Rosedale offers an exceptional product line that includes high-performance filtration solutions for multiple industries. Rosedale technicians help customers find the best, most cost-effective approaches to their filtration needs.

## **SANITARY FILTER HOUSINGS: FINE FILTRATION**

Rosedale sanitary service filters conform to USDA/3A dairy standards with housings of polished 316 stainless steel and have quick-release clamp-type covers. Outlets and inlets have sanitary flange connections. All internal surfaces can be visually inspected (and easily cleaned in place).

## **CONSTRUCTION**

Housings are all welded construction with all wetted parts of 316 stainless steel. All welded attachments are 300 series stainless steel. The materials and

manufacturing process exceed industry standards for sterile filtration.

## **APPLICATIONS**

Dairy, beverage, vegetable oils, and other foods and pharmaceuticals. They also make excellent pre-filters upstream of ultra-fine cartridge and membrane filters.



Rosedale T-Type

## **SPECIFICATIONS**

- Material: 316 stainless steel
- Surface Finish: 150 grit (25 RA)
- Inlet/Outlet Connection: 2" sanitary flange
- Vent/Drain: purge valves
- Filter Bag/Cartridge: accepts (1) #1 and #2 trade size filter bag or 500 series filter cartridge
- Operating Pressure: 100 psi (6.8 bar)

## **ROSEDALE PRODUCTS**

rosedaleproducts.com; 800-821-5373