

# NON-HYDROGENATED SOYBEAN OIL

*Plan your oils future today*



Over six years ago, the United Soybean Board (USB) actively engaged processors and manufacturers as part of an initiative to start working on soybean enhancements to produce soybean oil that would better meet the evolving needs of the food industry and their customers. This solutions-oriented approach has resulted in a number of alternatives to hydrogenation that range from relatively simple processing techniques to complex seed breeding technologies. Take a look at the range of possibilities.

## PROCESSING TECHNIQUES FOR HEALTHIER OILS

Some of the alternatives to hydrogenation come in the form of processing technologies that transform the composition of the oil so that the end product has few or no trans isomers. Following is a summary of processing techniques currently being used to improve the stability and functionality of soybean oil without creating trans fatty acids.

**Traditional Interesterification** is a process whereby fatty acids are exchanged among the triglycerides through the use of a chemical catalyst. No trans fatty acids are formed and interesterification only takes a few minutes. The most common uses for this process are margarine, baked goods and confections.

**Enzymatic Interesterification** is a process where the fatty acids are rearranged, most often in the 1 and 3 positions, through the use of a natural enzyme. It is precise, cost-effective and environmentally friendly. No trans fatty acids are produced. Common uses include margarine, baked goods and confections.

**Blending** is another effective technique. Blends can be formulated with traditional oils or oil fractions, including fully hydrogenated oil that contain no trans fat, and used in combination with specially processed oils that contain little or no trans. Suppliers have developed blended shortening products that support low/no-trans labeling for essentially all baked products.



## #1 FOR A REASON

Soybean oil's competitive cost, neutral flavor and balanced fatty acid profile make for a winning combination for food processors and manufacturers. The soybean industry recognizes the need to build intrinsic value into new varieties, and every link in the chain is committed to improving the nutritional value and overall functionality of soybean oil. With new technologies emerging every day, there is bound to be an even wider variety of options for all processors and manufacturers who are looking for viable soy-based alternatives to hydrogenated oil.

## BETTER BREEDING

In addition to the wide variety of processing techniques that reduce or eliminate the need for hydrogenation, the industry continues to work on soybean trait innovations to produce healthier oil with superior functionality characteristics. Whether through traditional breeding or advancements in biotechnology, the ultimate goal is to anticipate and better meet the needs of edible oil end users. Currently, top targets for soybean trait modifications include:

- Reduced saturates ( $\leq 7\%$ )
- Reduced linolenic acids ( $\leq 3\%$ )
- Increased oleic acids ( $> 50\%$ )
- Combinations of these traits



# QUALISOY™

Although soybean oil continues to be the number one choice for food processors and manufacturers, USB is working with industry leaders and private and public seed breeders to develop a soybean oil that does not require hydrogenation but still has the same superior functionality and flavor characteristics that the food industry has come to expect.

## LOW-LINOLENIC

The first commercially available improved trait is a low-linolenic soybean. These varieties offer reduced linolenic fatty acid content while maintaining the same low saturated fat content as partially hydrogenated oil (PHO) options. Low-linolenic soybeans are processed into an oil that offers comparable functionality to that of partially hydrogenated soy oils.

Low-linolenic soybean oil is a viable option for snack food companies, as well as for basic frying applications for the food-service arena. These oil varieties offer improved flavor stability (compared to PHO) and rival that of lightly hydrogenated oil. Applications that do not require a high level of oxidative stability due to high heat processing will benefit from this oil, as the flavor and shelf life of the product will exceed that of non-hydrogenated oils.

Today, several low-linolenic soybean oil options are available to the marketplace, each containing less than three percent linolenic acid. Low-linolenic soybeans that currently meet QUALISOY quality standards include a VISTIVE™ offering from Monsanto; Pioneer® brand low-linolenic soybeans; and Iowa State University's Ultra Low-linolenic Soybeans.

The resulting oils include Advantage Low-Linolenic Soybean Oil processed by Cargill; VISTIVE low-linolenic soybean oils processed by Archer Daniels Midland Company, Ag Processing Inc. (AGP), CHS Inc. and Zeeland Farms; TREUS™ Low-Linolenic Soybean Oil, developed in partnership by Bunge and DuPont; each with a range of two to three percent linolenic acid. Asoyia Ultra Low-Linolenic Soybean Oil, the primary oil marketed with ISU seed, ranges from 1.0 to 1.5 percent linolenic acid. Please note that these numbers reflect normal ranges, and may vary slightly according to environmental and growing conditions.

## INCREASED OLEIC

For improved oxidative stability with superior flavor stability, researchers are developing soybeans with increased levels of oleic fatty acid. Fried products, baked goods and other foods that undergo high heat during processing will benefit from this oil, because of a superior resistance to flavor breakdown during processing and improved shelf life. Varieties with the highest levels of oleic acid will offer heavy-duty, extended-usage frying oils. Most increased oleic varieties will also have a reduced linolenic acid content.

## LOW-SATURATE

While soybean oil has a low saturated fat content relative to many other oils, there is significant research under way to develop varieties with reduced saturates, especially reduced palmitic fatty acids, which are considered by many scientists to be the fatty acid most detrimental to human health.

## INCREASED OMEGA-3

The ratio of omega-3 fatty acids (found primarily in fish oils) versus omega-6 fatty acids in the diet is yet another cardiovascular health issue. Soybeans and soybean oil offer superior sources of omega-3 fatty acids, and researchers are developing a soybean even richer in omega-3 content. The goal of this enriched soybean is to create an affordable, land-based, renewable source of omega-3 that can be used as an alternative to create great-tasting foods rich in this essential nutrient.

## HIGH-STEARIC

Research on a soybean variety with a high-stearic fatty acid content is also under way. Since stearic acid is cholesterol-neutral compared to other saturated fatty acids, this soybean variety would produce a healthier oil option for those applications that require a solid fat. High heat stability research is also under way.

