

Soybean and Oilseed Facts

Soybeans and Oilseeds

Soy, Soya, Soybean

"Soya" (or "Soy" in the United States), is a legume, *Glycine max (L.) Merrill*. Soy has been grown for centuries in Asia and, more recently, has been successfully cultivated around the world. Today, the world's top producers of soy are the United States, Brazil, Argentina, China and India. Soy is one of the few plants that provides a complete protein as it contains all eight amino acids essential for human health.

Canola

Canola (a trademarked brand name) is a variety of rapeseed (see also, below) that was developed in the early 1970s using traditional plant breeding techniques by Canadian plant breeders to remove the anti-nutritional components (erucic acid and glucosinolates) from rapeseed to assure its safety for human and animal consumption.

Coconut

The coconut is the fruit of a palm tree, the *Cocos nucifera*. Coconuts consist of a mesocarp (fibrous covering), endocarp (shell), exocarp (the smooth outer skin) and copra meat or flesh. Mature nuts are consumed as such or processed for copra or desiccated coconut. The flesh, from which coconut oil is extracted, constitutes 40-70 percent of the weight of the husked coconut. About 36 percent of the flesh is a lauric oil.

Coconut is commercially grown primarily in the Philippines and Indonesia.

Corn

Corn, *Zea mays L.*, is a cereal crop, a member of the grass family. Corn is grown throughout the world and is one of the globe's most widely used food staples; corn varieties are directly used for food and animal feed or processed to make food and feed ingredients (such as high fructose corn syrup, corn starch and lysine) or industrial products such as ethanol and polylactic acid (PLA). The two primary methods of processing corn are referred to as "dry" and "wet" milling.

The oil extracted from corn germ has high polyunsaturated fatty acid content and oxidative stability. Its largest single use is in bottled oil for consumer use, followed by margarine and industrial snack-frying operations.

Cottonseed

Cottonseed is the seed of the cotton plant, which is mechanically separated from the fiber of the cotton boll. Cottonseed is used to produce edible oil, animal feed ingredients, and ingredients for other industrial and consumer products. Cottonseed oil is extracted using solvent extraction from the cottonseed kernel after delinting.

The world's top cottonseed producers are China, India, the United States and Pakistan.

Palm Oil

Palm oil is derived from the mesocarp, or flesh, of the fruit of the oil palm species *Elaeis guineensis*. Palm oil is high in carotenoids and tocotrienols, a form of Vitamin E, and it is used widely as a food oil. It may also be used to produce biodiesel.

The kernel of the oil palm fruit also may be crushed for oil, but this—unlike oil from the palm fruit—is a lauric oil, like that of the coconut. Palm kernel oil has food and industrial uses.

Almost all of the world's palm oil is produced in Malaysia and Indonesia.

Peanut

Peanuts, or "groundnuts" as they are known in some parts of the world, are the edible seeds of a legume, *Arachis hypogaea*, and they are high in protein, oil and fiber. Peanuts produced in the U.S. are mostly used in food and confection products, but more than 50 percent of the worldwide production is crushed for its oil.

Rapeseed

Brassica napus Linnaeus—known as rapeseed, rape, oilseed rape—is a bright yellow flowering member of the mustard or cabbage family. It is a mustard crop grown primarily for its seed, which yields about forty percent oil and a high-protein animal feed (see also canola). Rapeseed is grown mostly in China, India and the European Union. In addition to food and feed uses, rapeseed has become the primary feedstock for biodiesel production in Europe.

Sunflower

The sunflower is a distinctive, flowering plant (*Helianthus annuus L.*), the seeds of which contain a valuable edible oil that contains more Vitamin E than any other vegetable oil. Most sunflower oil is used in food products. The seeds of confection varieties of sunflower are also sold for human consumption and birdseed.

Sunflowers are grown in the U.S., Russia, the Ukraine, Argentina and the European Union, among others.

Soybean & Oilseed Products

Soyfoods

Soybeans have long been used as human food in Asia in such traditional foods as tofu, soymilk, tempeh and natto. Some of these foods have become popular in other parts of the world.

In recent years, however, breakthroughs in food science and processing have made it possible to use soybean ingredients in new ways, creating foods that are familiar to consumers but that incorporate parts of the soybean for functional or nutritional purposes. This has greatly expanded the food processing industry's use of soybeans and soy-based ingredients.

Biodiesel

Biodiesel is a methyl ester-based fuel made from fat or oil sources including soybean oil, other vegetable oils and animal fats, for use in compression-ignition (diesel) engines. Methyl esters are produced in the reaction of fats with methyl alcohol in the presence of an alkaline catalyst. Glycerine is a byproduct of transesterification, the most common processing method. Biodiesel is usually blended with petroleum-based diesel fuel, although it may be used without doing so.

Production of biodiesel has increased rapidly in recent years as interest in replacing petroleum-based fuels has grown. The European Union has the most established biodiesel industry, and the primary feedstock used there is rapeseed oil. Soybean oil is the most common feedstock in the rapidly-growing industry in the United States. Biodiesel is also being commercially produced in Asia from palm oil.

Ethanol

Ethanol is an alcohol fermented from sugar, and as such can be made from many natural source materials containing fermentable sugars or carbohydrates. Almost all ethanol currently being produced uses either sugar or corn as a feedstock. When corn is used, the starch must first be broken down into sugar, which is then distilled and dehydrated. Significant

investment continues to be made into production of cellulosic ethanol, that is, ethanol from other starches than sugarcane or corn, but this is not yet commercially viable. Ethanol can be used as a fuel alone or in mixture with petroleum products. Most ethanol is produced in Brazil and the United States.

Health Factors

Soy & Health

In comparison to many of today's major food sources, soybeans are truly a nutritional superpower. They contain the highest amount of protein of any other grain or legume, and substantial amounts of fat, carbohydrates, dietary fiber, vitamins, minerals and a virtual drugstore of phytochemicals useful for the prevention and treatment of many chronic diseases.

Trans Fats

Trans fatty acids, or trans fats, are unsaturated fatty acids that have at least one double bond in the *trans* configuration. Most trans fats are produced by hydrogenation, in which a vegetable oil is heated in the presence of a metal catalyst and hydrogen.

Recent research indicates that trans fatty acids—like saturated fats and dietary cholesterol—raise LDL (or "bad") cholesterol. Since January 1, 2006, labels on food sold in the U.S. must list the amount of trans fatty acids found in each product.

Food manufacturers continue to search for satisfactory alternatives to hydrogenated oils in order to reduce trans fat levels as far as practicable (a small amount of trans fat occurs naturally in a number of foods including some meats).