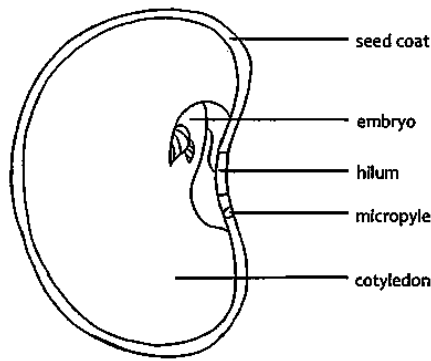


Soybean

Feeling adventurous in the kitchen during lockdown time? Let's look at soybean. In recent times, there is a dramatic increase in the sale and consumption of soy food. From whole and fermented soy food to soy-based products like mock meats and cheeses, everyone seems to be eating a little more soy these days. The claim is that soy is the only vegetable product that has all the protein content of meat, eggs or milk products, its protein supplies a full and well-balanced mixture of the essential amino acids, more complete than other legume proteins, all essential to the diet of vegetarians and vegans.



Seed coat protects the embryo before germination
Embryo will grow to become the adult plant
Hilum marks the place where the seed is attached to the ovary wall
Micropyle is the tiny hole through which the pollen tube enters during fertilization; it is the point of water entry into the seed.
Cotyledon encloses the embryo during germination; it is also the food source for the embryo.



Soybean or soya bean is a cultivated annual plant native to eastern Asia. The plant has an erect hairy stem and large trifoliate leaves. The fruit is a slightly curved and hairy pod that grows in clusters of three to five. Each pod is 4 to 8 cm long and usually contains 2 to 4 seeds. The seeds come in various sizes and the seed coat (hull) in many colors: black, brown, yellow, green and mottled. The scar, visible on the seed coat, is called the hilum or the 'eye'; at one end of the hilum is the micropyle - a small opening which allows the absorption of water for sprouting.

Soybean was a crucial crop in eastern Asia long before written records but did not become an important crop outside of Asia until much later. As parts of the diet - an important diet - soybeans were adopted in China and then later in Japan, Korea and southeast Asian countries long before they became part of European, American and Australian diets. Soy was introduced to Africa from China in the late 19th century, and is now widespread across the continent.

When first introduced to Europe in the early 18th century and later in North America, soybean crop was considered an industrial product, grown for hay and soymeal used as animal feeding, however it is now beginning to become an established staple of the western world.

There is a reason for the slow acceptance of soybeans in the west: simply considered as beans and cooked in the conventional way, soybeans are extraordinarily tough and indigestible, even after long boiling. In eastern countries, they are used in their dried state; most of the crop is processed and transformed into altered products such as tofu, tofu skin, natto, miso, tempeh, bean paste, soy sauce etc. A full-fat soymilk can be made by cooking whole soybeans in water and using a cloth to strain the milk (liquid) from the fibrous part of the cooked beans. Tofu can be made from full-fat soymilk by using salts or acids to coagulate the milk into curds that can be pressed into 'cakes'. Tofu can also be further preserved through fermentation. Natto is another good example of a whole food form of soybean, it is made by taking whole soybeans, adding a bacteria called *Bacillus subtilis*, and giving the bacteria time to ferment the beans. Other fermented soy foods include soy sauce, soybean paste, tempeh, miso, etc. These are whole food forms of soybean, standing in sharp contrast to the modern processed forms, such as soy protein concentrate, textured vegetable protein, which are made into a wide variety of vegetarian food used as a meat substitute or meat extender in many processed foods such as vegetable burger, soybean steak etc.

Edamame: Home gardeners in warmer climates can take to growing soy plants for their immature pods, commonly known as green soybean, vegetable soybean or edamame, now readily available, fresh and/or frozen, in many supermarkets. Edamame is a Japanese word that translates 'beans on branches', which describes the way this vegetable grows: the pod appear in bunches on branched bushy plants. The plants grow to about 2 to 3 feet high, need some support as they may flop over, especially in areas subject to wind and heavy rains. The beans are typically picked when immature inside the green, 4-5cm long and somewhat plump pod. These beans can be boiled or steamed whole in their pods, shelled and served with salt, under the Japanese name 'edamame', a popular appetizer at many Japanese restaurants. Enjoy them also as a snack, or add them to salads, rice, pasta, and other dishes.



Soybean oil, extracted from the seeds of soybean, is one of the most widely consumed cooking oil. The oil can also be processed into margarine, shortening. In industry, soy oil is used as an ingredient in cosmetics, soaps, paints, adhesives, fertilizers, insect sprays etc. Defatted soybean meal is a significant and cheap source of protein for animal feeds. Agricultural-economic wise, soybean crop produces significantly more protein per acre than most other uses of land. Soybean also plays a valuable role in cropping rotations as it contributes to the soil nitrogen balance and can improve soil structure.