



## Zion Farmers Market Veg-u-cation

### Leaves of Iron



Spinach (*Spinacia oleracea*) is one of wonderful green-leafy vegetable often recognized as one of the *functional foods* for its wholesome nutritional, antioxidants and anti-cancer composition. Its tender, crispy, dark-green leaves are one of the favorite ingredients of chefs all around the planet.

Botanically, it belongs to the *Amaranthaceae* family, and its scientific name: ***Spinacia oleracea***.

*Spinacia* plant grows to about 1 foot in height. Although it can be grown year round, its fresh greens are best available soon after the winter season from March through May in the Northern hemisphere, and from September until November in the South of the equatorial line.

At least, two varieties of spinach are cultivated for their edible leaves; Savoy type with dark-green *crinkle (wrinkled) leaves* and *flat-leaf* type with smooth surfaced leaves.

Spinach is thought to have originated in ancient Persia (modern Iran and neighboring countries). It is not known by whom, or when, spinach was introduced to India, but the plant was subsequently introduced to ancient China, where it was known as "Persian vegetable" (*bōsī cài*; 波斯菜; present: 菠菜). The earliest available record of the spinach plant was recorded in Chinese, stating it was introduced into China via Nepal (probably in 647 AD).

In AD 827, the Saracens introduced spinach to Sicily. The first written evidence of spinach in the Mediterranean was recorded in three 10th-century works: the medical work by al-Rāzī (known as Rhazes in the West) and in two agricultural treatises, one by Ibn Waḥshīyah and the other by Qusṭus al-Rūmī. Spinach became a popular vegetable in the Arab Mediterranean and arrived in Spain by the latter part of the 12th century, where the great Arab agronomist Ibn al-'Awwām called it رئيس البقول *ra'īs al-buqūl*, 'the chieftain of leafy greens'. Spinach was also the subject of a special treatise in the 11th century by Ibn Ḥajjāj.

The prickly-seeded form of spinach was known in Germany by no later than the 13th century, though the smooth-seeded form was not described until 1552. (The smooth-seeded form is used in modern commercial production.)

Spinach first appeared in England and France in the 14th century, probably via Spain, and it gained quick popularity because it appeared in early spring, when other vegetables were scarce and when Lenten dietary restrictions discouraged consumption of other foods. Spinach is

mentioned in the first known English cookbook, the *Forme of Cury* (1390), where it is referred to as 'spinnedge' and/or 'spynoches'. Smooth-seeded spinach was described in 1552.

Spinach was supposedly the favourite vegetable of Catherine de' Medici. Dishes served on a bed of spinach are known as "Florentine", reflecting Catherine's birth in Florence.

During World War I, wine fortified with spinach juice was given to French soldiers weakened by hemorrhage.



### **Production, marketing, and storage**

Spinach is sold loose, bunched, packaged fresh in bags, canned, or frozen. Fresh spinach loses much of its nutritional value with storage of more than a few days. While refrigeration slows this effect to about eight days, spinach will lose most of its folate and carotenoid content, so for longer storage, it is blanched and frozen, cooked and frozen, or canned. Storage in the freezer can be for up to eight months.

The Environmental Working Group reported spinach is one of the dozen most heavily pesticide-contaminated produce products. The most common pesticides found on spinach are permethrin, dimethoate, and DDT.<sup>[1]</sup> Spinach is high in cadmium contamination. An FDA study found more in boiled spinach in the early 1990s (0.125 mg/kg) than in the 320 other foods studied.

Spinach is packaged in air, or in nitrogen gas to extend shelf life. Some packaged spinach is exposed to radiation to kill any harmful bacteria that may be on the leaves. The Food and Drug Administration approves of irradiation of spinach leaves up to 4.0 kilograys; however, using radiation to sanitize spinach is of concern because it may deplete the leaves of their nutritional value. Researchers at the Agricultural Research Service experimentally tested the concentrations of vitamins C, E, K, B<sub>9</sub>, and four carotenoids in packaged spinach following irradiation. They found with increasing level of irradiation, four nutrients showed little or no change. Those nutrients include vitamins B<sub>9</sub>, E, K, and the carotenoid neoxanthin. This study showed the irradiation of packaged spinach to have little or no change to the nutritional value of the crop, and the health benefits of irradiating packed spinach to reduce harmful bacteria seem to outweigh the loss of nutrients.



## Health benefits of Spinach

- Spinach is store house for many phyto-nutrients that have health promotional and disease prevention properties.
- Very low in calories and fats (100 g of raw leaves provide just 23 calories). Its leaves hold good amount of soluble dietary fiber and no wonder green spinach is one of the finest vegetable sources recommended in cholesterol controlling and weight reduction programs by dieticians!
- Fresh 100 g of spinach contains about 25% of daily intake of iron; one of the richest among green leafy vegetables. Iron is an important trace element required by the human body for red blood cell production and as a co-factor for oxidation-reduction enzyme, *cytochrome-oxidase* during the cellular metabolism.
- Fresh leaves are rich source of several vital anti-oxidant vitamins like vitamin A, vitamin C, and flavonoid poly phenolic antioxidants such as lutein, zeaxanthin and beta-carotene. Together, these compounds help act as protective scavengers against oxygen-derived free radicals and reactive oxygen species (ROS) that play a healing role in aging and various disease processes.
- *Zeaxanthin*, an important dietary carotenoid, is selectively absorbed into the retinal macula lutea in the eyes where it thought to provide antioxidant and protective light-filtering functions. It thus, helps protect from "age-related macular related macular disease" (ARMD), especially in the elderly.
- In addition, vitamin A is required for maintaining healthy mucus membranes and skin and is essential for normal eyesight. Consumption of natural vegetables and fruits rich in vitamin A and flavonoids also known to help the body protect from lung and oral cavity cancers.
- Spinach leaves are an excellent source of vitamin K. 100 g of fresh greens provides 402% of daily vitamin-K requirements. Vitamin K plays a vital role in strengthening the bone mass by promoting osteotrophic (bone building) activity in the bone. Additionally, it also has established role in patients with *Alzheimer's disease* by limiting neuronal damage in the brain.
- This green leafy vegetable also contains good amounts of many B-complex vitamins such as vitamin-B6 (pyridoxine), thiamin (vitamin B-1), riboflavin, folates and niacin. Folate help prevent neural tube defects in the offspring.
- 100 g of farm fresh spinach has 47% of daily recommended levels of *vitamin C*. Vitamin C is a powerful antioxidant, which helps the body develop resistance against infectious agents and scavenge harmful oxygen-free radicals.
- Its leaves also contain a good amount of minerals like *potassium*, manganese, magnesium, copper and zinc. Potassium is an important component of cell and body fluids that helps controlling heart rate and blood pressure. Manganese and copper are used by the body as a co-factor for the antioxidant enzyme, *superoxide dismutase*. Copper is required in the production of red blood cells. Zinc is a co-factor for many enzymes that regulate growth and development, sperm generation, digestion and nucleic acid synthesis.
- It is also good source of omega-3 fatty acids.

Regular consumption of spinach in the diet helps prevent osteoporosis (weakness of bones), iron-deficiency anemia. Moreover, its soft leaves are believed to protect human body from cardiovascular diseases and cancers of colon and prostate.

