

Winged bean

an alternate to soybean

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Winged bean also known as Asparagus pea, Winged pea, Goa bean and Four-angled bean. It is a tropical perennial herb or vine that climbs by twining. However, it can be grown as annuals. It grows abundantly in hot, humid equatorial countries ranging from the Philippines and Indonesia to Thailand, India, Burma and Sri Lanka. In India, Winged bean is grown in Tamil Nadu, Kerala, Karnataka, Goa, Maharashtra, Odisha, West Bengal and in some regions of north-eastern hilly states. Being a tropical plant it is sensitive to frost and water-logging. The winged bean plant grows as a vine with climbing stems and leaves, 3-4 m in height. It is an herbaceous perennial, but can be grown as an annual. It is generally taller and notably larger than the common bean. Winged bean is widely recognized by farmers and consumers in southern Asia for its variety of uses and disease resistance.

Keywords: Soybean, Winged bean

THE winged bean is an underutilized species but has the potential to become a major multi-use food crop in the tropics of Asia. The winged bean species can climb by twining their stems around a support. Winged bean has the tremendous nutritional value and importance.

Nutritional view

Winged bean possesses the outstanding qualities for human nutrition, whose all plant parts are usable. The nutritive quality of cooked winged bean, as estimated by protein efficiency ratio and net protein utilization values, compares well with soybean. With exception of the soybean and peanut, no other commonly consumed food legumes can rival the winged bean in the combination of protein and oil. The top three sets of leaflets are better in protein content and digestibility than mature ones. Plant itself can also be used as a highly nutritive cattle feed and can be used as a cover crop also to conserve the moisture of the soil.

Leaves and flower: The young leaves can be picked and prepared as salad or as a leafy vegetable. The plants flower during short days (< 12 hr). Its flowers have pale blue appearance and have a sweet taste and their protein content (2.8 to 5.6 %) appears to be fairly high as compared to flowers of other known tropical plants. Its leaves have lower lysine content, but uncommonly have high content of tryptophan, a nutritionally essential amino acid. They are also rich source of vitamins A and C. Also a compound (lotion) is prepared from its leaves to cure small pox.

Pods: The bean pod is typically 15 to 22 cm (6 to 8.5 inch) long and has four wings with frilly edges running lengthwise. The pods are usually rectangular, but sometimes appear flat. Pods may be coloured cream, green, pink, or purple. Pods may appear smooth or rough, depending on the genotype. The skin is waxy and the flesh partially translucent in the young pods. When the pod is fully ripe, it turns an ash-brown and

splits open to release the seeds. Pod may be used in salad, soups, stews and curries, may be boiled in water or coconut milk or sautéed in oil which makes it acceptable for consumption as compared to any bean pods.

Seed: Seed shape is often round; oval and rectangular seeds also occur. Seeds may appear white, cream, dark tan, or brown, depending on growing and storage conditions. Its mature dry seed contains 30 to 42% protein and their favorable amino acid composition, along with high amount of edible oil (15 to 20%). The dried seeds can be used as a flour and also to make a coffee like drink. The matured seeds can be steamed, boiled, fried, roasted or made into milk or tofu. The lactin derived from its seeds is used commercially in medicinal diagnostic.

Tubers: Certain genotypes produce good amount of tuberous roots which can be used as root vegetable similar to potato have nutty flavour and are more nutritious than any other tuberous food crop. It was found that removal of flowers

increases tuber harvest. Its tuber have extra ordinary high amount of protein (8 to 15 % at dry weight basis) as compared to 1-5 % for cassava, potato, yam etc. Its exceptional combination of high amount of protein and carbohydrate provides sufficient energy to otherwise under nourished human population.

Nodulation: All parts of winged bean are rich in protein which could be attributed to its abundant nodulation and consequent high nitrogen-fixation. It nodulates more heavily than any other legumes which gives the crop its agricultural interest especially with its excellent residual effect on yield of subsequent crops. Its nodulation (440 to 1,000 nodules plant) is capable of minimizing the application of fertilizer. The root nodule of winged bean contains high amount of Indole Acetic Acid (10.4 μ -g of fresh weight) and high level of gibberellic acid, cytokinin, ABA and tryptophan. Among the hormones auxin, gibberellin and cytokinin are reported to be transported from the nodules to other plant parts.

Cultivation

Basically, growing winged bean is a

very similar process to growing bush snap beans. The winged bean seeds are difficult to germinate and must be scarified first or soaked in water overnight prior to planting. Winged beans need short, cool days to promote blooming; however, they are frost sensitive. The plants grow best in hot, wet climates with 60 to 100 inches (150 to 250 cm) of rain. This bean grows well in most soils as long as they have good drainage. This crop thrive well in compost and fertilizer (20:10:10) into the soil before sowing the seeds. Plant the seeds 1 inch (2.5 cm) deep and maintain the distance 2 feet (60 cm) (between the rows) and 4 feet (120 cm) (between the plants). You can trellis the vines or not, but trellised vines produce more legumes. The plant grows quickly, reaching a length of 4 m in a few weeks therefore it needs staking for higher yields. The top of the main vine can be pinched out when it has produced 10 to 12 leaves to encourage side shoots. Winged beans can fix their own nitrogen (N) when the bacterium *Rhizobium* is in the soil. Fertilize again once pods begin to develop. Harvest the pods when young and tender, around two weeks after pollination has occurred.

SUMMARY

Winged bean is similar to soybean in both use and nutritional content. The winged bean seeds are just as good as soybean in quantity and quality of its protein, when combined with corn. Winged bean has the protein value of milk and can adequately nourish a protein-starved infant. The nutritive quality of cooked bean as estimated by protein to efficiency ratio and net protein utilization values compares well with soybean. Like soybean, winged bean seeds contains edible oil (mostly unsaturated) that is rich in Tocopherol (Vitamin E) (some varieties even have levels higher than those of soybean and corn oils), leaving behind protein-rich flour suitable for making bread or cereals. Winged bean oil not only contains acceptable amounts of unsaturated fatty acids (especially Linoleic acid) but in contrast to soybean oil (56%), the content of Linolenic acid is quite low (39 to 42%), giving winged bean to oil the advantage of greater stability.

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Holistic strategy for assessment of Soil Health

New Delhi. 26 June 2018, A Brainstorming Session on 'Holistic strategy for assessment of Soil Health' was organized in Delhi. Dr Trilochan Mohapatra, Secretary (DARE) and Director General (ICAR), emphasized on importance of soil testing and management of soil health to meet the challenges of food security. As the factor productivity and rate of response of crops to applied fertilizers under intensive cropping systems are declining year-after-year, inclusion of soil physical and biological parameters becomes imperative to maintain self-sufficiency in food grains production and agriculture growth on sustainable basis, he added.

Dr Asok Dalwai, CEO (NRAA), highlighted the importance of quick and simple techniques for assessment of soil physical and biological parameters, and sensor-based technology for repeated measurements over a period of time.

Earlier, Dr K. Alagusundaram, Deputy Director General (Natural Resource Management), briefed about the background of organizing the brainstorming session.

Dr S K Chaudhari, ADG (SWM), highlighted the importance of soil health card, NRM Division (ICAR) involvement in developing Soil Test Kit and its importance in preparing soil health card.

The meeting was attended by Smt A Neeraja, Joint Secretary (INM), Dr Claudia Sadoff, Director General, International Water Management Institute (IWMI), Dr A K Sikka, IWMI- India Representative, Scientists from CG Centers, ICAR Institutes.

