



Hop Shoots – World’s Most Costliest Vegetable

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Humulus lupulus (Hop) is a vigorous, dioecious perennial climbing plant belonging to the family of Cannabaceae cultivated exclusively for its medicinal, household and other culinary purposes. It has been known for its immense value in the brewing industry. Hop products and various processed products are now considered indispensable flavoring ingredient of beer and ales produced in many countries worldwide. Hop shoots are a delicate vegetable greatly sought after in most of the European countries.

Taxonomy:

Hop Shoots belong to the family of Cannabaceae (hemp) family which includes two genera, hop (*Humulus*) and hemp (*Cannabis*). Again, The genus *Humulus* has two species: *Humulus lupulus* (common hop) and *Humulus japonicas* (Japanese hop). *Humulus lupulus* is a diploid ($2n=2x=20$) plant. The annual shoots of the plant grows up to a height of over 7 meters. *Humulus lupulus* are dioecious in nature which can be easily identified at flowering time. Females produce tiny “burrs” which develop into small cones called “strobiles” while males produce panicles with numerous flowers each containing 5 anthers.

Ecology:

Hop shoots plants are best adapted to latitudes between 30 and 50 degrees latitude north and south of the equator. Long day-length is required for its flowering. Flowering starts in late June or early July in the Northern hemisphere, depending on the maturity traits of specific cultivars. Hop shoots plants grow well in a temperature range between 40° and 70°F. The plants require about 120 days of uninterrupted frost-free days to attain maturity and over 15 hours or more of sunlight for proper growth and development. Hops grow well in soils ranging from sandy to loamy and the roots may grow up to several meters deep. An ample supply of moisture is required during its entire growing season.

Benefits:

Wild hop shoots are quite popular in Mediterranean region and are cooked in different ways. After boiling, young shoots have low fat content (<0.2g/100g), energy value (25 kcal/100g), and sodium content (<40g/100g). They are a good source of dietary fiber and Vitamin B9. Moreover, Hop shoots have high Vitamin C levels and so are potential sources of new functional ingredients in developing new foods. Fresh green shoots have a short shelf life, so they should be consumed shortly or processed to store them safely for a longer period.

Nutritional Value:

The alpha acids and beta acids contained within the strobili contribute a bitter taste when the hops are added to Beer. The major types of different alpha acids are humulone, cohumulone, adhumulone, prehumulone and posthumulone. Beta acids also contribute to the bitterness of hops, although the compounds themselves are not bitter. Humulones and lupulones have been shown to kill cancer cells along with blocking leukemia cells from further damaging the bones. Apart from these



compounds, Hop shoots possess essential oils. The pungent smell in Hop shoots is due to the presence of Myrcene.

Cultivation:

Hops are propagated from runners that arise from the crown just below the soil surface. The soil selected for planting should be well drained with a pH of 6.0-7.0. Trellising systems are adopted by growers for commercial cultivation. The spacing depends on the size of equipment utilized for mowing, tilling and harvesting between rows. Drip irrigation is ideal for water supplement as the plant possesses a shallow root system.

Market Value:

The price or cost of Hop shoots in the market is approximately €1000 per kg (Rs. 85,000-90,000 per Kg), as the production cost is quite high. Hop shoots are highly expensive because the harvesting process involves Back-breaking. The Global Hops market is estimated to grow at a CAGR of 4.5%, during the forecast period (2020-2025). Europe is one of the fastest growing markets for Hop shoots.

Conclusion:

Farmers in some nations are equipped with modern practices of farming to lower the expenditure incurred in labor cost and thereby enhance the production of Hop shoots. Researches are being conducted at Indian Vegetable Research Institute (IVR), Varanasi regarding the adoption of improved production strategies. Being a High value crop, extensive studies are needed to be done in the field of Agriculture to develop proper cropping techniques and advanced practices keeping in mind the production cost involved.

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