



High Volume and Rich in Nutrients “Green Leafy Vegetables”

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Vegetables play a vital role in the balanced diet of human beings. According to ICMR, New Delhi consumption of vegetable in healthy balanced diet 300gm vegetables having 125gm leafy vegetables, 100gm root and tuber vegetables, 75gm other vegetables, but it will increase upto 400gm (FAO). The most commonly leafy vegetables viz., spinach (Beet), palak, amaranth, chenopodium, vegetable mustard, is grown in India. Leafy vegetables are rich in calcium and phosphorus which help in reducing hypertension and it is a high source of zeaxanthin and carotenoids that can flush out the free radicals from human body.

Source of minerals and vitamins respectively Ca, Fe, P, Na, K and vitamin A in spinach (9300 IU) and palak (9770 IU), Vit. B, folic acid, Vit. C and also used for roughages. Spinach contains **vitamin C** that also helps. Spinach is one of the most well-known foods for fighting anemia in conjunction with expert medical treatment.

Green leafy vegetables are rich source of natural antioxidants, such as flavonoids, pigments, phenolics, carotenoids, and vitamins. These natural antioxidant phytochemicals used against several diseases, such as cardiovascular diseases, cancer, eye health, anti-diabetic, anti-ulcer, cure anemia, nutritive appetizer, prevent constipation, atherosclerosis, retinopathy, arthritis, emphysema, and neurodegenerative diseases

In present time green leafy vegetables are cultivated in pot herbs hydroponics and kitchen garden. Green leafy vegetables (GLV) are contains highly nutritive value so their productivity increases day by day. Specially in Rajasthan GLV are used making various delicious foods like palak pakoda, puri, kari, palak paneer, raita ,parantha and sun dries leaves or powder used in butter milk.

| Name of crop | Improved Varieties | Health Benefits |
|-------------------|---|---|
| Amaranths | Pusa Kiran, Pusa Lal Chaulai, Pusa Kirti, Arka Varna, Arka Samraksha and Arka Arunima | Vita. A-9200 IU/100gm P- 800 mg, K- 230 mg, Ca-397mg/100gm, Iron- 22.9% |
| Chenopodium | Pusa Bathua-1 Kashi Bathua-2 Kashi Bathua-4 | Vita. A- 11,300 IU/100gm |
| Palak | Jobner Green, Pusa Bharati, All Green and Arka Anupama | Vita. A- 9770 IU/100gm, Ca- 380 mg/gm |
| Spinach | Virginia Savoy, Early Smooth leaf, Khara palak, Banarasi | Vita. A -9300 IU/100gm, Ca- 73 mg/100gm, K- 605 mg/100gm |
| Vegetable mustard | Pusa Sag-1 | P – 384mg/100gm,Ca- 115mg/100gm |

Climate and soil :-Green leafy vegetables are required cool weather conditions and also withstand frost condition ;Amaranths requires warm season and also withstand up to 45°C temp. In reference of Rajasthan, temperature rises 45°C and below -5°C (Jobner)and green leafy vegetables are successfully grown in this climate condition.

Leafy vegetables are growing successfully wide range of soil but mostly preferred sandy loam soil, pH range 6 to 8, soil should be well drained, well fertile, rich organic matter.

Field preparation:-Soil should be thoroughly prepared by ploughing 4-5times before sowing. Bulky organic manures like well rotten cow dung or compost should be incorporated evenly in the soil.

Sowing: Leafy vegetables are green all-round the year

| S. No. | Leafy Vegetables | Sowing time | Seed rate (Kg/ha.) |
|--------|------------------|---------------------|--------------------|
| 1 | Palak | July - September | 25 - 30 kg |
| 2 | Spinach | September - October | 35 – 40 kg |
| 3 | Amaranths | June - July | 2 – 2.5 kg |

Manure and fertilizers: Palak is a leafy vegetable which requires more nitrogen for crown growth, apply N@ 20-25 kg /ha after every cutting as top dressing, a basal does of 200-300 q/ha of well decomposed FYM or compost should be mixed with soil at least 2-3 weeks before sowing . Basel dose of amaranthus NPK -50:30:20 kg/ha and spinach NPK -80-100:60:60 kg/ha. Full dose of P and K, and one –fourth dose of N are applied 20-25kg N/ha after every cutting, with weeding and hoeing.

Leafy vegetables are rich source of chlorophyll for chlorophyll formation micro nutrients like Fe, Mn, Mg in the rate of 20-25kg/ha. are required.

Irrigation: Irrigation depends on the soil weather and season. GLV required light irrigation for proper germination of seeds. In summer irrigation should be done in 5-7 days intervals & winters 10-15days intervals.

Drip irrigation is a very useful method of applying water and nutrients to crops. Crop yields can increase through improved water and fertility management and reduced disease.

Weed Management: Green leafy vegetables are required two to three weeding or hoeing is sufficient to keep the weeds under control and good aeration condition. Regular weeding should also be done to keep the field free from weeds in early stage. Weeding and hoeing are very helpful after every cutting. Mulch around the plant also helps conserve soil moisture and reduce weed growth.

Harvesting:-The crop is ready for the first cutting in about 3-4 weeks after sowing and subsequent at 15-20days. 3-4 cuttings are done. 20-25 kg N /ha N are applied after every cutting. Harvesting is not done early in the morning because there is dew on the crop spinach and palak are cut just above the root. It is then washed, trimmed, graded and bunched or bagged; remove disease on yellow eaves before marketing.

Yield:-Yield depends up on the type of cultivars, management practice and growing season etc.

Amaranthus - 60-80 q/ha for fresh leaves.

Spinach - 80-100 q/ha.

Palak - 80-120 q/ha.

Disease and pest of green leafy vegetables:

| Disease of green leafy vegetables | | | |
|-----------------------------------|--|---|---|
| Disease | causal organism | Symptoms | Management |
| Damping off | <i>Fusarium oxysporum</i> , <i>Pythium spp.</i> | death of seedling and poor seed germination | Soil drench or foliar spray (3-4 tsp/ gallon of water) of Organocide Plant Doctor |

| | | | |
|--------------|--|---|---|
| Downy mildew | <i>Peronospora farinose</i> | Disease appears as irregular, numerous, small, yellow areas surrounded by green tissue scattered all over the leaf lamina. | Spray Dithane Z-78(0.3%) or Indofil M-45 (0.2%) and repeat at weekly interval |
| Anthraxnose | <i>Colletorichum lagenarium</i> | Lesion turns brown to brownish in colour, small, circular, water-soaked lesions on both young and old leaves. | Seed treatment with Agrosan GN or bavistin @ 2g/Kg seed. |
| Leaf spot | <i>Alternaria spp.</i> <i>Cercospora spp.</i> | Angular, white to brown small lesions appear on the leaves. At later stage short hole appear. Concentring rings appear due to infection of <i>Alternaria</i> spp. | Spray of Hexaconazole (0.1%) or Bordeaux mixture (1%). |
| Pest | | | |
| Leaf minor | | <ul style="list-style-type: none"> • The parasitic wasp <i>Diglyphus isaea</i> is a commercially available beneficial insect that will kill leaf miner larva in the mine. • Use yellow or blue sticky traps to catch egg laying adults. | |
| Aphids | | <ul style="list-style-type: none"> • Introduce Natural Predators-Assassin Bugs • Use Yellow sticky Traps • Broadcast spray Garlic Barrier for small or large-scale applications. • Aphid Parasites –<i>Aphidius colemani</i>, <i>Aphelinus abdominalis</i>, <i>Aphidius ervi</i> etc. are use | |