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Nature's Nutrient Giants: The Green Leafy Superfoods

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Vegetables are an essential component of a balanced human diet. According to the Indian Council of Medical Research (ICMR), a healthy daily intake should include approximately 300g of vegetables — comprising 125g of leafy greens, 100g of root and tuber vegetables, and 75g of other varieties. However, the Food and Agriculture Organization (FAO) recommends increasing this quantity to 400g per day for better health benefits. In India, popular leafy vegetables include spinach (beet), palak, amaranth, chenopodium, vegetable mustard, portulaca (kulfa), and poi. These leafy greens are excellent sources of calcium and phosphorus, which aid in managing hypertension. Additionally, they are rich in zeaxanthin and carotenoids, powerful antioxidants that help eliminate free radicals from the body.

Name of crop	Improved Varieties	Health Benefits
Amaranth	Pusa Kiran, Pusa Lal Chaulai, Pusa Kirti, Arka Varna, Arka Samraksha and Arka Arunima	Vitamin A-9200 IU/100g P- 83mg/100g, K-341 mg/100g, Ca-397mg/100g, Iron-25.5mg/100g, Vitamin C-130-173mg/100g, Protein- 4g/100g
Chenopodium	Pusa Bathua-1 Kashi Bathua-2 Kashi Bathua-4	Vitamin A- 11,300 IU/100g
Palak	Jobner Green, Pusa Jyoti, Pusa Bharati, All Green, Thar Hariparna and Arka Anupama	Vitamin A- 9770 IU/100g, Ca- 380 mg/100g, Protein- 3.4% and iron (16.2 mg/100g)
Spinach	Virginia Savoy, Early Smooth Leaf, Khara Palak, Banarasi	Vitamin A -9300 IU/100g, Ca- 73 mg/100g, K- 206mg/100g
Mustard greens	Pusa Sag-1, Pusa Bold	P – 384mg/100g, Ca- 115mg/100g

Green leafy vegetables are an excellent natural source of antioxidants, including flavonoids, pigments, phenolic compounds, carotenoids and essential vitamins. These antioxidant-rich phytochemicals play a significant role in preventing and managing various health conditions such as heart diseases, cancer, diabetes, eye disorders, anemia, ulcers and neurodegenerative diseases. They are also valued for their benefits in improving digestion, stimulating appetite and addressing issues like arthritis, retinopathy, atherosclerosis, emphysema and constipation. Today, the cultivation of green leafy vegetables is gaining popularity in kitchen gardens, hydroponic systems and pot herb setups. Due to their high nutritional content, the demand and production of these vegetables are steadily increasing. In Rajasthan, green leafy vegetables hold a special place in local cuisine, being used to prepare a variety of dishes such as palak pakoda, puri, curry, palak paneer, raita and stuffed parathas. Additionally, sun-dried

leaves or their powdered forms are often added to buttermilk and other recipes for enhanced flavor and nutrition.

Agro-Production Practices of Leafy Vegetable

Climate and Soil: Green leafy vegetables generally thrive in cooler weather and are capable of tolerating light frost. However, certain varieties like amaranth prefer warmer climates and can endure temperatures as high as 45°C. In the context of Rajasthan, where temperatures fluctuate between -5°C (as recorded in Jobner) and 45°C, these leafy vegetables are successfully cultivated under such diverse climatic conditions.

These vegetables grow well in a variety of soil types but perform best in sandy loam soils. An ideal soil pH ranges from 6.0 to 8.0. The soil should be fertile, rich in organic matter, well-drained, and have good moisture-holding capacity to support healthy plant growth.

Field Preparation: Before sowing, the land should be properly prepared by ploughing 4 to 5 times to achieve a fine, friable soil texture. It is important to evenly incorporate well-decomposed organic manure, such as farmyard manure or compost, into the soil during land preparation. This improves soil fertility, structure, and moisture retention, providing an optimal growing environment for green leafy vegetables.

Sowing: Leafy vegetables are green all-round the year

Leafy Vegetables	Sowing time	Seed rate (Kg/ha.)
Palak	July - September	25 - 30 kg
Spinach	September - October	35 – 40 kg
Amaranths	June - July	2.0 – 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*.

Amaranth - 250-300 q/ha for fresh leaves. The crop will be ready for the first cutting in about 25-30 days after sowing. The subsequent cuttings of about 4-5 can be taken at an interval of 10-12 days. One hectare of good crop (line sown) gives about 250-300 q green leaves and 200 q of greens by broadcasting.

Spinach – It is ready for first trimming in about four weeks after sowing, and the subsequent trimmings may be done at 15 days interval. One crop in the season gives approximately 4-6 cuttings with the total yield of about 50-60 q/ha.

Palak - The crop will be ready for its first cutting approximately 25-30 days after sowing. During the season, it typically provides around 4-6 cuttings, yielding a total of about 80-100 quintals per hectare.

Disease and pest of green leafy vegetables

Disease	Causal organism	Symptoms	Management
Damping off	*Pythium spp*. and *Rhizoctonia solani*	High mortality rate in nursery stage. Rotting at collar region of newly emerging seedling even seed germination effects.	Soil drench (3g/ liter of water) or foliar spray Mancozeb 2 g/liter of water
Downy mildew	*Peronospora farinose*	Appears as irregular, downey cottony growth seen on lower portion of the leaf and 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
Anthracnose	*Colletorichum dematium*	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	*Alternaria spp. Cercospora spp*.	Angular, white to brown small lesions appear on the leaves. At later stage short hole appear. Concentring rings appear due to infection of Alternaria spp.	Spray of Bordeaux mixture (1%).
Insect			
Leaf minor	The parasitic wasp *Diglyphus isaea* 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	Introduce Natural Predators-Assassin Bugs Use Yellow sticky Traps Broadcast spray Garlic Barrier for small or large-scale applications. Aphid Parasites –Aphidius colemani, Aphelinus abdominalis, Aphidius ervi etc. are use.		