www.journalworlds.com
AGRI JOURNAL WORLD
VOL. 5 ISSUE 3 JULY-SEPTEMBER, 2025

NUTRITIONAL POTENTIAL OF UNDERUTILIZED EXOTIC GREENS IN INDIA

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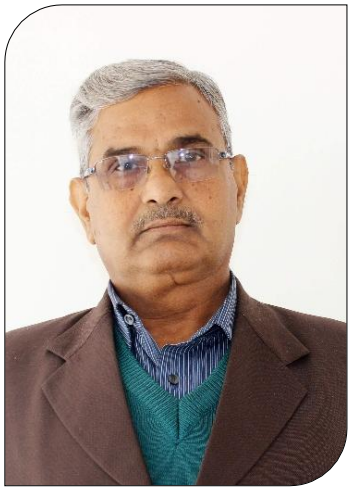

ABSTRACT

Underutilised horticultural crops offer immense potential for enhancing nutrition, promoting biodiversity, and supporting sustainable agriculture, especially in marginal environments. This article explores six such crops—Cape Blueberry, Cape Gooseberry, Bael, Jamun, Karonda, and Kachnar—highlighting their nutritional richness, adaptability to adverse conditions, and unique bioactive compounds. These crops often surpass commercial counterparts in specific nutrients such as vitamin C, polyphenols, and proteins, yet remain neglected due to poor market integration and limited awareness. By drawing comparative nutritional insights, the article emphasises the need for renewed focus on these crops to diversify food systems, address micronutrient deficiencies, and strengthen rural livelihoods.

KEYWORDS: Exotic vegetables, Farm diversification, Nutritional potential, Peri-urban farming, Sustainable agriculture

INTRODUCTION

India's vegetable landscape is evolving rapidly with the rising demand for nutritious, gourmet, and health-promoting foods. Underutilized exotic greens such as broccoli, asparagus, kale, zucchini, Pak Choi, and colorful bell peppers are emerging as promising alternatives to traditional vegetables. Supported by India's diverse agro-climatic zones, these crops can be successfully cultivated across various regions, offering rich sources of vitamins, minerals, antioxidants, and dietary fiber. However, limited awareness and weak supply chains have restricted their wider adoption. This article explores the nutritional potential, cultivation practices, and market prospects of exotic greens, emphasizing their role in enhancing health, profitability, and sustainability.

BROCCOLI (*Brassica oleracea var. italica*):

Broccoli is widely recognized as a super food because of its anti-cancer properties due to sulforaphane

and high antioxidant content. A 100 g serving provides about 34 kcal of energy, 89 mg of vitamin C, 101.6 µg of vitamin K, 63 µg of folate and 2.6 g of fiber. Its high fibre content aids digestion while its bioactive compounds help fight chronic diseases. In India, broccoli cultivation is gaining pace especially in northern hill states and peri-urban belts of big cities where consumers demand fresh heads year-round. Broccoli grows best in cool climates (15–20°C). It requires well-drained fertile loam soil rich in organic matter with a neutral pH. Farmers raise healthy seedlings in nurseries for 25–30 days and transplant them in beds at 45 cm spacing. Regular irrigation and weeding ensure good head development, and mature heads are harvested 75–90 days after transplanting.

Broccoli **Broccoli in field**

Speciality: Known as a 'superfood', broccoli is prized for its anti-cancer properties due to the compound sulforaphane and its high vitamin C and fiber content.

Purpose of Cultivation: Grown mainly for fresh consumption in salads, soups, and stir-fries. Urban households, restaurants, and hotels prefer farm-fresh heads. Farmers grow it as a high-income winter vegetable in peri-urban zones and hilly regions.

ASPARAGUS (*Asparagus officinalis*):

Asparagus, though little known in Indian rural belts, is highly prized in gourmet cuisines. Each 100 grams of tender spears contain about 20 kcal, 52 µg of folate, 41.6 µg of vitamin K and 2.1 grams of fiber. It acts as a natural diuretic and is rich in antioxidants which promote heart health. Asparagus cultivation is ideal for mild temperate regions of India like Uttarakhand and Himachal Pradesh. It prefers sandy loam soil enriched with organic compost and good drainage. Commercial growers plant one-year-old crowns in deep furrows about 30–40 cm apart. It needs regular irrigation but hates waterlogging. Though the plantation takes about two years to establish, it yields tender spears every spring for up to 10–15 years,

ensuring sustainable returns.

Speciality: Tender shoots of asparagus are delicacies in gourmet dishes; they have diuretic and antioxidant properties.

Purpose of Cultivation: Grown for luxury restaurants, export-quality processing, and fresh sale in elite supermarkets. It's a perennial crop — once established, it provides harvests every spring for up to 15 years.

Asparagus crop

ZUCCHINI (*Cucurbita pepo*):

Zucchini, or summer squash, is increasingly popular among urban consumers due to its mild taste and low calorie count. 100 g of fresh zucchini provides just 17 kcal, 17.9 mg of vitamin C, 261 mg of potassium and 1.1 grams of fiber. Zucchini helps in weight management and is easy to digest. It can be grown almost year-round in plains with temperatures between 18–24°C. Sandy loam soil with good organic matter suits it best. Farmers sow seeds directly on raised beds or pits, thin the seedlings to maintain one healthy plant per pit, and keep the field weed-free. Regular irrigation encourages healthy, tender fruits which are harvested when 10–15 cm long, usually 50–60 days after sowing.

Speciality: Low in calories and easily digestible, zucchini is popular in continental cuisine and modern salads.

Zucchini fruit

Purpose of Cultivation: Farmers grow it for fresh domestic markets, urban kitchen demand, and supply to hotels and cafes. It's also used for making pickles and grilled vegetable mixes.

KALE (*Brassica oleracea var. acephala*):

Kale is rightly called a 'nutrient powerhouse'. 100 grams of kale supplies about 35 kcal, 93.4 mg of vitamin C, 817 µg of vitamin K and 4.1 grams of fiber. Its high alkaline content helps detoxify the body and boost immunity. In India, it thrives in cool winter climates with temperatures between 10–20°C. Kale prefers loamy soil rich in organic matter. Farmers start seeds in nursery beds and transplant seedlings when 4–5 weeks old at about 40 cm spacing. Mature leaves can be picked from the base as needed, allowing the plant to keep producing fresh foliage for several weeks.

Speciality: One of the most nutrient-dense leafy greens, kale is rich in vitamins K, C, and antioxidants that boost immunity and detoxify the body.

Purpose of Cultivation: Primarily grown for the health food market — sold as fresh bunches in supermarkets and to salad bars. Also processed into kale chips and health powders.

Kale

ARTICHOKE (*Cynara scolymus*):

The globe artichoke is an exotic vegetable known for its edible flower buds which are a delicacy. 100 g gives about 47 kcal, 11.7 mg vitamin C, 68 µg folate and 5.4 grams fiber. It helps regulate cholesterol and supports liver health. Artichoke requires a mild winter climate (12–20°C) and deep fertile loam soil. It is propagated mainly through root suckers or offshoots planted at 1–1.5 meter spacing due to its wide spread. Buds are harvested when tight and before they bloom. Though it needs good care, it can yield for 4–5 years and fetch high prices in premium markets.

Speciality: The edible flower buds are a delicacy in Italian and Mediterranean cuisines; it lower bad cholesterol and aid liver health.

Purpose of Cultivation: Mainly grown for high-end gourmet use and export. Hotels, star restaurants and

specialty grocers source fresh artichokes directy from contract growers.

Artichoke

CELERY (*Apium graveolens*):

Celery, used in salads, soups and garnishes, is valued for its refreshing flavour and health benefits. It is very low in calories (16 kcal per 100 g) but rich in fiber and provides about 29.3 µg vitamin K. It supports digestion and has a cooling effect on the body. In India, it can be cultivated in mild winters in well-drained sandy loam soils. Farmers raise seedlings in nurseries and transplant them at 20–30 cm spacing. Adequate irrigation and mulching help develop crisp stalks, which are ready for harvest in about 90–100 days.

Speciality: Known for its crisp stalks and refreshing flavor; low calorie, high fiber — aids digestion and cools the body.

Purpose of Cultivation: Used widely in salads, soups, and as a garnish. Fresh celery fetches premium prices in supermarkets and health stores. Also used in juice bars.

Celery

LETTUCE (*Lactuca sativa*):

Lettuce is an essential ingredient in salads and burgers but is still not commonly grown on a large scale in India. It provides 15 kcal per 100 g with good amounts of vitamin A and 126.3 µg vitamin K. It has a

hydrating, refreshing quality and is easy to digest. It grows well in cool climates (12–20°C) and prefers sandy loam soil with ample organic matter. Direct sowing or transplanting is done at 30 cm spacing. Crisphead and loose-leaf types are harvested in 45–60 days.

Speciality: A staple for fresh salads, burgers, and wraps. It hydrates and supplies mild vitamins, adding crunch and freshness.

Purpose of Cultivation: Massively used by fast-food chains, salad bars, and home kitchens. Farmers prefer short-duration varieties for quick turnover and year-round supply.

Lettuce

BELL PEPPER (*Capsicum annuum*):

Red and yellow bell peppers are rich in natural antioxidants and color pigments. They contain about 31 kcal, a massive 127.7 mg vitamin C and 2.1 g fiber per 100 grams, which is much higher than ordinary green capsicum. Sweet peppers add vibrant color and flavor to dishes. They thrive in warm climates (20–30°C) in fertile, well-drained soil. Seedlings are raised in nurseries for 30–40 days and transplanted at 45 cm spacing. Fruits are harvested when fully colored, around 90–100 days after transplanting.

Speciality: Vibrant red, yellow, and orange peppers are rich in vitamin C and natural pigments (beta-carotene, lutein). They taste sweeter than green capsicum.

Bell Pepper

Purpose of Cultivation: Used for salads, pizzas, stir-fry, and stuffing. High demand in urban retail stores, restaurants, and hotels. Also exported fresh and used in frozen vegetable mixes.

PAK CHOI (*Brassica rapa subsp. chinensis*):

Pak Choi, also known as Bok Choy, is popular in Asian cuisines for stir-fry and soups. 100 grams provide about 13 kcal, 45 mg vitamin C, 45.5 µg vitamin K and 1 gram of fiber. It has a mild, sweet flavor and tender leaves. Pak Choi can be grown in mild climates (15–25°C). It grows best in sandy loam soil with high organic content. Seeds are sown directly or seedlings are transplanted. Plants are harvested whole at the baby stage in about 45–50 days.

Speciality: Tender leafy vegetable popular in Chinese stir-fries and soups; mildly sweet with juicy stalks.

Purpose of Cultivation: Supplies Asian restaurants and urban kitchens. It's a fast-growing leafy green ideal for intensive vegetable gardening in peri-urban zones.

Pak Choi

PARSLEY (*Petroselinum crispum*):

Parsley is a flavourful herb loaded with nutrients. 100 grams provide about 36 kcal, 133 mg vitamin C and an impressive 1640 µg of vitamin K. It is widely used in salads, sauces, and garnishes. Parsley prefers mild temperatures and loose, fertile soil. It can be sown directly in beds or raised in trays and transplanted. Regular cutting of leaves promotes fresh growth and can be done multiple times during the season.

Speciality: An aromatic herb used to flavor dishes and as a garnish; extremely high in vitamin K and antioxidants.

Purpose of Cultivation: Widely grown for fresh herb packets in supermarkets, culinary herb gardens, and restaurant supply. Dried parsley is used in spice mixes too.

Parsley

CONCLUSION

Underutilized exotic greens hold immense promise for India's nutrition-sensitive and market-driven agricultural future. Their superior nutritional content, growing consumer preference, and export potential make them valuable additions to the national food basket. With proper farmer training, technical support, and efficient marketing systems, these crops can transform peri-urban and hill agriculture into profitable ventures. Encouraging their cultivation will not only diversify income but also improve dietary quality and promote sustainable production systems. By integrating exotic greens into mainstream farming and food supply chains, India can advance toward healthier populations, resilient farming communities, and a more vibrant, globally competitive vegetable sector..

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How to cite:

Singh A. (2025). Nutritional potential of underutilized exotic greens in India. Leaves and Dew Publication, New Delhi 110059. *Agri Journal World* 5 (3): 6-13.

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